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THE NORTH AMERICAN SPECIES OF CLAVARIA WITH ILLUSTRATIONS OF THE TYPE SPECIMENS

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While little is known at present about the distribution of the various species of *Clavaria* in North America, nevertheless so many species of the genus have been described from North America that all students of this genus should find of permanent use the original descriptions of these species, their spore characters, and photographic illustrations of the type specimens. As further aid toward the study of local gatherings of species of *Clavaria* there are included also descriptions and photographs of the type illustrations, if in existence, of such European species as have been generally recognized as occurring in North America. I have appended a similar study of such South American and North Pacific Exploring Expedition species as were available for examination in the herbaria visited.

In order that specimens may be accumulated to show the geographic range of the species in North America, local study of the coral fungi in all parts of North America is greatly needed and notes on characters of fresh specimens, because some original, distinctive characters of the various species are not retained in the herbarium. For example, distinctive odor of garlic and an unusual taste have been given as determining characters in some recently described species and should be recorded for gatherings whenever noteworthy. Color of the fresh specimens is very important and should be noted, preferably in terms of a color standard such as Ridgway's, for there is the probability that the

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local gatherings may eventually be made available for showing distribution of the species to any one preparing a monograph of the genus.

Spore collections from the fresh specimens and record of the color of spores as a check in case of fading are of the highest importance for accurate determination at the time of gathering or for later study by a specialist. In many species the spores, as obtained from dried herbarium specimens, are unmistakably hyaline as seen with the microscope, while in many other species one cannot be quite sure from the microscopic examination alone whether the spores might not be appreciably colored in the mass, for the enormous magnification by the compound microscope dilutes the color of the spore to the same degree in the image seen.

Of the various methods of spore collection and preservation for the *Clavariaceae, Thelephoraceae, Hydnaceae, Polyporaceae,* and *Tremellaceae,* that on clean glass is preferable. Large cover glasses are sometimes used, but I cut with a glass cutter discarded negative plates or thin broken window panes into rectangles about 2 to 3 inches long and 1 inch wide. The falling spores adhere to the glass and are protected from dust by enclosure in close-fitting paper envelopes. In this condition they are preserved in the envelope or packet which holds the gathering from which the spore fall was saved. The color of these spores when first collected should be recorded, preferably on the envelope of the spore packet. In addition to showing the color of the spores, such mass collections consist of mature spores of normal size and form. Furthermore, a fructification which yields a copious spore fall is a mature specimen worth preservation and study and not one of the carelessly collected, worthless, sterile, immature things which clutter up herbaria and waste valuable time.

I have intentionally omitted synonymy of American species except in cases where later recognized by the authors themselves of species concerned. Before relegating species to synonymy, they should be studied from their author's point of view and an endeavor made to find characters separating them from related species. Good progress can be made by locating gatherings of Clavarias among the following species whenever in close agreement with any of them and noting cases in which the same specimen agrees exactly with two or more species, for it is well known that authors working independently of one another frequently describe the same species under different names, one

author emphasizing one set of characters and passing over others and another author emphasizing a different set of characters.

KEY TO THE SPECIES

§I. Fructifications branched ---------- 1
§II. Fructifications somewhat simple, cespitose at the base or fasciculate 28
§III. Fructifications somewhat simple, distinct at the base---------- 30

§I. RAMARIA. Branched species

C. rugosa and *C. Herveyi* sometimes have simple fructifications; *C. lavendula* is included in §II although somewhat branched and *C. sphaerospora* in §III although rarely branched.

1. Spores colored in the mass ---------- 2
1. Spores white in the mass, or at least hyaline in cases where mass color is unknown ---------- 14
2. Fructifications large, up to 10–15 cm. high ---------- 3
2. Fructifications medium-sized, 4–8 cm. high ---------- 6
2. Fructifications small, 1–3 cm. high ---------- 12
3. Spores about 3 times as long as broad ---------- 4
3. Spores about twice as long as broad ---------- 5
4. Branches red-tipped, spores 12–16×4–5 μ; striate ---------- *1. C. botrytis*
4. Branches red-tipped, spores 9–11×3–4 μ; rough ---------- *2. C. botrytoides, 3. C. conjuncta*
4. Whole fructification reddish to madder brown; stem elongated---- *4. C. holorubella*
4. Branches ochraceous, dichotomous, obtuse; stem short---------- *5. C. obtusissima*
5. Fructifications up to 15 cm. in diameter, pinkish buff, becoming violet and finally black where bruised ---------- *6. C. formosa*
5. Fructification ochraceous, becoming reddish where bruised ---------- *7. C. flava*
5. Fructification ochraceous, with a stout, pale trunk very dichotomously branched ---------- *8. C. aurea*
5. Fructifications whitish or creamy yellow; spores minutely rough, 8–10×4½–5 μ ---------- *9. C. densa*
5. Fructifications drying chamois-colored, with all branches anastomosing; spores mostly even, a few minutely rough ---------- *10. C. densissima*
5. Fructifications smoky ochraceous, drying drab to hair-brown; spores asperate ---------- *11. C. fumigata*
5. Fructifications reddish brown, drying Dresden brown to snuff-brown, radicated; spores intensely colored, strongly echinulate---------- *12. C. grandis*
6. Growing on the ground; spores intensely colored, strongly echinulate ---------- 7
6. Growing on the ground; spores pale-colored under the microscope--- 8
6. Growing on wood ---------- 11
7. Deep blue at first, becoming brownish olive in the herbarium; spores 10–13×6–8 μ---------- *13. C. cyanocephala*
7. Grayish brown at first, becoming Dresden brown in the herbarium; spores 11–15×6–8 μ---------- *14. C. spiculospora*
7. Dark brown at first, becoming tawny olive in the herbarium; spores 6–8×4–5 μ---------- *15. C. longicaulis*
8. Fructifications white, becoming yellowish or cream-colored with age, and sometimes red where bruised; spores 14×4 μ, even ---------- *16. C. xanthosperma*
8. Fructifications whitish, tardily acrid to taste, then bitter; spores 12–15×4–5 μ, even ---------- *17. C. albida*
8. Fructifications colored; spores more than 10 μ long---------- 9
8. Fructifications colored; spores not more than 10 μ long---------- 10

9. Pale yellow or whitish; stem short, soon branched; spores minutely uneven, 10–13×3½–4½ μ ---- *18. C. secunda, 19. C. crassipes*
9. Pale drab with tips of branches olive-green, becoming everywhere fuscous in the herbarium; spores rough, 10–12×4–4½ μ ---- *20. C. testaceoflava* var. *testaceoviridis*
10. Forming spherical tufts 3–5 cm. in diameter, turning green where bruised; in coniferous woods ---- *21. C. abietina*
10. Fructifications cespitose from a subiculum, buff-yellow, dichotomously branched ---- *22. C. flavula*
10. Dried stem 3 cm. long, 8 mm. in diameter, longitudinally furrowed, now clove-brown; spores minutely rough, 9–10×3½–4½ μ; in North Carolina ---- *23. C. leucotephra*
10. Fructification yellow, with bruises turning brown, in the herbarium becoming tawny olive and discolored olive-brown; spores 7–9×3½–4 μ; in North Carolina ---- *24. C. f avobrunnescens*
11. Fructifications tough, ochraceous, tinged with vinous, with root-like strands of white mycelium at base; taste bitter ---- *25. C. stricta*
11. Fructifications as in *C. stricta* but acrid to taste; spores minutely rough, 6–7×4–4½ μ ---- *26. C. acris*
11. Fructifications creamy yellow when young, becoming vinaceous cinnamon or reddish brown when mature, not becoming green where wounded; not bitter; spores 8–9×3–4 μ ---- *27. C. tsugina*
11. Fructifications flesh-colored, then cinnamon; branches flattened; spores intensely colored, echinulate, 8×6 μ; in Dominica ---- *28. C. cervicornis*
12. On pine log; spores 7½–9×4½–5 μ ---- *29. C. pinicola*
12. On ground in Cuba; spores 13–15×9–10 μ ---- *30. C. brunneola*
12. On ground in coniferous woods; spores less than 10 μ long ---- 13
13. Bright ochraceous, rather tough but flaccid, not turning green when bruised ---- *31. C. flaccida*
13. Yellowish, stem rather tough and drying olive-buff; branches drying drab; spores minutely rough, conglutinate in small groups in preparations ---- *32. C. pusilla*
13. Pallid or almost whitish, drying pinkish buff, often rising from whitish mycelium whose strands bind the leaf mold; spores minutely rough, 7½–9×3–3½ μ; in spruce woods ---- *33. C. circinans*
13. Drying pinkish buff, dichotomously branched, with white mycelial strands at base; spores 6×3 μ ---- *34. C. flavuloides*
13. Pale ochraceous buff, fragrant, drying cream-buff; spores 4½–6×2½–3 μ ---- *35. C. fragrantissima*
13. Tawny, with whitish mycelial strands, drying Saccardo's umber; spores rough or slightly subangular, 4–4½×2½–3 μ, conglutinate into small groups in preparations ---- *36. C. myceliosa*
14. Fructifications white ---- 15
14. Fructifications whitish to tan-color ---- 20
14. Fructifications ochraceous or yellowish ---- 21
14. Fructifications grayish ---- 26
14. Fructifications lilac to violet ---- 27
15. Spores globose or subglobose, less than 6 μ in diameter ---- 16
15. Spores globose or subglobose, more than 6 μ in diameter ---- 17
15. Spores broadly ovoid, even or minutely rough ---- 18
15. Spores echinulate or tuberculate ---- 19
16. Fructifications 5–12 cm. high, ivory-white to creamy white, dichotomously branched, base sometimes pink; spores even, 3–4½ μ in diameter ---- *37. C. Kunzei*
16. Fructifications 8 cm. high, dichotomously branched, white to alutaceous, some branches rose-pink ---- *38. C. arborea*
16. Fructifications 7½–12 cm. high, white or whitish, dichotomously branched; spores rough, 3½–4½ μ in diameter or 4½×3½ μ ---- *39. C. subcaespitosa*
16. Fructifications 10 cm. high, white, drying cartridge-buff; stem and branches fibrillose-squamulose, tough; spores even, 5–6 μ in diameter; in Brazil. Belongs in *Lachnocladium* ---- *108. C. cirrhata*
16. Fructifications 3–4 cm. high, white, soon turning brown or black;

probable spores 3–4×3 μ; in China ---------- *104. C. decolor*

17. Fructifications 2–6 cm. high, with branches numerous, flattened upward and cristate; spores even, 9–12×6–8 μ ---------- *40. C. cristata*

17. Fructifications 3 cm. high, cespitose, drying with branches somewhat flattened, becoming bright antimony-yellow in the herbarium; spores 6–8×6 μ ---------- *41. C. mutans*

17. Fructifications solitary or in small groups, simple or somewhat branched above, rugose, becoming antimony-yellow in the herbarium; spores even, 9–11×8–9 μ ---------- *42. C. rugosa*

18. Fructifications very small, 2 cm. high, branched above, base of stem rufous; spores even, 4–6×3–4 μ ---------- *43. C. rufipes*

18. Fructifications 1–4 cm. high, dichotomously branched; spores becoming rough ---------- *44. C. asperula, 45. C. asperulans*

19. Fructifications 3–4 cm. high, flour-white, soft, many branches flattened; spores tuberculate ---------- *46. C. nodulosperma*

19. Fructification 4 cm. high, forked above five or six times, slender; spores echinulate, 3½–4×2½–3 μ; in Brazil. Probably a *Lachnocladium* ---------- *109. C. dealbata*

20. Growing on wood, 3–10 cm. high, pallid, then alutaceous, somewhat reddish; branches and branchlets hollowed out into cup-shape at the apex and with margins of the cups proliferous ---------- *47. C. pyxidata*

20. Growing on wood but only 5 cm. high, branches and branchlets not hollowed out cup-shaped at the apex; spores 4×2–2½ μ ---------- *48. C. Petersii*

20. Growing on wood, pale yellow, then fawn-color, final branchlets encircled with crown of minute processes; spores 3–6×2–3 μ ---------- *49. C. coronata*

20. Growing on the ground, 2–5 cm. high; spores subglobose, 9½×8–9 μ; not fleshy. A *Lachnocladium* ---------- *99. C. ornatipes*

20. Growing under bark, alutaceous white, dichotomously branched, minutely subtomentose; not fleshy. Probably a *Lachnocladium.* ---------- *100. C. subcorticalis*

20. Growing on the ground, 2–3 cm. high, divided from the base, branches compressed; basidia longitudinally septate. A *Tremellodendron* ---------- *102. C. tenax*

21. Spores ovoid or cylindric ---------- 22

21. Spores globose or subglobose ---------- 24

22. Spores not even ---------- 23

22. Spores even, flexuous, 13–15×3½–4 μ; fructifications 2–4 cm. high; in pine woods ---------- *50. C. pinophila*

23. Fructifications 5–7 cm. high, ochraceous; spores 4–5×2½–3 μ, with slender spines ---------- *51. C. asterella*

23. Fructifications 5–10 cm. high; branches widely spreading, pale ochraceous; spores 11–13×4½ μ, distinctly rough ---------- *52. C. divaricata*

24. Growing on wood, 15 cm. high, with stem 2–3 cm. thick; spores asperulate, 6×5 μ ---------- *53. C. lentofragilis*

24. On leaves and twigs in Brazil, 1 cm. high, ochraceous; spores even, 4–5 μ in diameter ---------- *105. C. delicia*

24. Growing on the ground; stem tough, tomentose, pale yellow; branches orange; spores 3–4 μ in diameter. A *Lachnocladium.* ---------- *101. C. vestipes*

24. Growing on the ground; not tomentose ---------- 25

25. Fructifications apricot-yellow, 3–4 cm. high; spores even, 5–7 μ in diameter ---------- *54. C. corniculata*

25. Fructifications pale yellow, 2–5 cm. high, tips of branches obtuse; spores even, 7–9×6–7 μ, mostly 7×6 μ ---------- *55. C. Peckii*

25. Fructifications ochraceous yellow, 2–4 cm. high, tips of branches obtuse; spores even, 5–6×4½–5 μ ---------- *56. C. muscoides* var. *obtusa*

25. Fructifications ochraceous yellow, 2½ cm. high, tips of branches obtuse; taste bitter; spores 5–6 μ in diameter ---------- *57. C. fellea*

25. Fructification golden yellow, with aspect of a dried specimen of *C. rugosa;* spores even, 8–9 μ in diameter ---------- *58. C. Herveyi*

26. Fructifications 3–5 cm. high; basidia with 2 sterigmata; spores

even, 7–10×6–8 μ ---------- *59. C. cinerea*
26. Fructifications 7 cm. high; basidia with 4 sterigmata; spores even, 5–6 μ in diameter ---------- *60. C. cinereoides*
27. Fructifications lilac, becoming yellowish in drying, 3–4 cm. high; spores even, 5–7 μ in diameter ---------- *61. C. amethystina*
27. Fructifications pale lilac, becoming tawny olive in drying, 2–4 cm. high; spores even, 6–7×5–6 μ ---------- *62. C. amethystinoides*
27. Fructifications 1–1½ cm. high, lavender, drying pinkish buff; spores 3×2 μ ---------- *63. C. exigua*

§II. SYNCORYNE. Species somewhat simple, cespitose at the base or fasciculate.

28. Fructifications bright yellow ---------- 29
28. Fructifications dingy greenish yellow or cinereous; spores asperate, 4½×3 μ ---------- *68. C. Macouni*
28. Fructifications drying drab; hair-like cystidia in the hymenium; in Porto Rico ---------- *69. C. pilosa*
28. Fructifications pale buff, rugulose; spores even, 10–10½×4½ μ ---------- *70. C. pallescens*
28. Fructifications clay color, blackening in drying; spores even, 6–7×3–3½ μ ---------- *71. C. nebulosa*
28. Fructifications lilac-pink, somewhat branched; spores even, 6×3 μ ---------- *72. C. lavendula*
28. Fructifications white; spores even, 3–5×3–4 μ ---------- *73. C. vermicularis*
29. Fructifications hollow, golden yellow verging to cinnabar at first, now between cinnamon-drab and Rood's brown in the herbarium; spores hyaline, even, globose, 5–6 μ in diameter ---------- *64. C. aurantio-cinnabarina*
29. Fructifications often becoming hollow, clear canary-yellow, odorless when fresh, taste bitter; spores at first yellow, then colorless, even, globose, 5–7 μ in diameter ---------- *65. C. fusiformis*
29. Fructifications probably solid, compressed, yellow-alutaceous, now honey-yellow in the herbarium, 5–8 cm. long, tips obtuse; spores hyaline, even, globose, 5–6 μ in diameter ---------- *66. C. compressa*
29. Fructifications solid, compressed, canary-yellow at first, now yellow ocher, tips obtuse; spores hyaline, even, globose, 5–6 μ in diameter ---------- *67. C. platyclada*

§III. HOLOCORYNE. Species with clubs simple, distinct at the base, solitary or gregarious.

30. Fructifications white ---------- 31
30. Fructifications cinereous or mouse-colored ---------- *80. C. sphaerospora*
30. Fructifications pale rufous ---------- *81. C. filipes*
30. Fructifications yellow ---------- 34
30. Fructifications ochraceous to umber ---------- 38
31. Fructifications very small, usually less than 1 cm. high; on mosses, wood and stems of herbs ---------- 32
31. Fructifications more than 1 cm. high; growing on the ground ---------- 33
32. Fructifications 6 mm. high and pallid or white when growing, now 2 mm. long and pale pinkish-buff in the herbarium; spores hyaline, subglobose, 3–3½×3 μ; on moss ---------- *74. C. tenuis*
32. Fructifications up to 6 mm. high when growing, white, now pinkish buff in the herbarium; spores hyaline, even, 5–7×3–3½ μ; on moss in Cuba ---------- *75. C. misella*
32. Fructifications 1–2 cm. high, white or yellowish; on wood ---------- *76. C. mucida*
32. Fructifications 4 mm. high, white, not fleshy, difficult to crush under cover glass; on stems of *Epilobium*. A *Pistillaria* ---------- *103. C. Typhuloides*
33. Dull white to sordid yellow, becoming cinnamon-brown in the herbarium; spores even, 3–4×2½–3 μ ---------- *77. C. biformis*
33. White, yellowish when dry, now russet in the herbarium; spores even,

7–9×4½–6 μ ---------- *78. C. subfalcata*
33. White, yellow when dry, now with hymenial portion honey-yellow and stem somewhat drab; odor of garlic; spores published as 6–9×5–7 μ ---------- *79. C. foetida*
34. On dead branches of *Carya;* 4 mm. high, pale yellow ---------- *82. C. spathulata*
34. Growing on the ground; spores about 2 or 3 times as long as broad ---------- 35
34. Growing on the ground; spores broadly ovoid or subglobose ---------- 36
35. Pale greenish yellow, 2–5 cm. high; taste like tallow; spores even, 10–11×5–6 μ ---------- *83. C. argillacea*
35. Yellowish or cream-colored, dried fructification 8 mm. high and pinkish buff; spores curved, 6–7×2½–3 μ ---------- *84. C. corynoides*
35. Pale yellow, 2½ cm. high, tip acute or acuminate; spores somewhat rugose, 7–8×3½ μ ---------- *85. C. gracillima*
35. Pinkish cinnamon, about 1 cm. high; spores even, 7–7½×2½–3 μ; on earth coated with bluish green algae ---------- *86. C. vernalis, C. clavata*
36. Fructifications 4–7½ cm. high, yellow to orange; spores subglobose, spiny, 5–6 μ in diameter ---------- *87. C. inaequalis*
36. About 1½ cm. high, citron-yellow; spores even, 4½–5×3 μ ---------- *88. C. citriceps*
36. About 2½ cm. high, pale golden yellow, somewhat pellucid; spores even, 4–4½×3–3½ μ ---------- *89. C. clara*
36. About 2½ cm. high, yellow to golden yellow; spores even, more than 5 μ long ---------- 37
37. Intense golden yellow, now cinnamon in the herbarium; spores probably hyaline, even, 4½–6×4–4½ μ; in Cuba ---------- *90. C. laeticolor*
37. Yellow, sometimes darker at apex, drying tawny to brick-red; spores hyaline, even, 6×4½ μ ---------- *91. C. pulchra*
37. Yellow, drying Prussian red, with apex acute; spores 6–7×4½–5 μ ---------- *92. C. flavella*
38. Fructifications large, 5–15 cm. high by 1–5 cm. thick, clavate, ochraceous buff; spores 9–11×4½–5 μ or larger ---------- *93. C. pistillaris*
38. Fructifications 3–7 cm. high, up to 1 cm. thick above, much narrowed downward, ochraceous; flesh solid; spores even, 10–14×4 μ ---------- *94. C. ligula*
38. Fructifications 5–20 cm. high, 2–5 mm. in diameter, becoming hollow; growing on buried wood ---------- *95. C. fistulosa*
38. Fructifications 2–4 cm. high, contorted; spores 14–18×6–9 μ; erumpent on alder branches ---------- *96. C. contorta*
38. Fructifications up to 5–8 cm. high, filiform, rusty to brownish, acrid to taste; spores 8–12×4–5 μ; on dead fallen leaves of frondose trees ---------- *97. C. juncea*
38. Fructifications 4–7 cm. high, 2–3 mm. in diameter, wood-brown; spores globose, 6–7 μ in diameter ---------- *98. C. asperulospora*
38. Fructifications less than 1 cm. high, pale umber, scabrous; spores probably subglobose, 1½–2 μ in diameter; in Brazil ---------- *107. C. scabra*

1. **Clavaria botrytis** Persoon, Comment. Clav. 42. 1797; Syn. Fung. 587. 1801; Myc. Eur. **1**: 161. 1822; Fries, Syst. Myc. **1**: 466. 1821; Hym. Eur. 667. 1874; Berkeley, Outl. Brit. Fung. 278. 1860; Sacc. Syll. Fung. **6**: 692. 1888; Peck, N. Y. State Mus. Rept. **32**: 57. 1879, and **48**: 211. *pl. 39. f. 5-7.* 1896; Morgan, Cincinnati Soc. Nat. Hist. Jour. **11**: 87. 1888; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**:171. 1919. Plate 1, fig. 1.

Illustrations: Schaeffer, Icones Fung. *pl. 176;* Holmskiold, Fungi Dan. **1**: *pl. 32;* Fries, Sverig. Atl. Svamp. *pl. 35;* Atkinson,

Mushrooms, *text f. 202;* Hard, Mushrooms, *text f. 386;* Peck, *loc. cit.* References to many other illustrations in Sacc. Syll. Fung. **19**: 316.

Fructifications large, 10–12 cm. across and 7–12 cm. high, forming fleshy rounded masses with a short, stout base, densely branched above, white to buff, the tips of the branches reddish; smell slight, pleasant, taste pleasant; stem short, stout, white, tapering below; branching irregular, the primary branches few and stout (2–3 cm.), ultimate branches slender (2–3 mm.), more or less dichotomous; flesh solid, white; spores dull ochraceous in the mass, copious, entire in outline but with fine longitudinal or oblique striations often anastomosing, 12–16×4–5 μ.

On ground among leaves in woods.

Cotton and Wakefield add further that *C. botrytis* may always be recognized by its characteristic, striate spores.

I find the spores striate in the European specimen distributed as *C. botrytis* in Rabenhorst, Herb. Myc., 122, but none of the American specimens labelled *C. botrytis* in the exsiccati of Ravenel, Ellis & Everhart, and Shear have striate spores, and they differ further from *C. botrytis* as understood in Europe in having the spores minutely rough and only 10–12×3–4 μ, which are distinctive characters of *C. botrytoides.* Does *C. botrytis* occur in North America ?

2. C. botrytoides Peck, N. Y. State Mus. Bul. **94**: 21, 49. *pl. 93. f. 5-7.* 1905; Sacc. Syll. Fung. **21**: 426. 1913 Plate 1, fig. 2.

Type: in N. Y. State Mus. Herb.

"Stem small, short, divided near the base into branches which are repeatedly and irregularly branched, the ultimate branches short, crowded, blunt, usually terminating in two or more blunt teeth or protuberances, red or pink at the tips when young, soon fading and becoming concolorous, stem and branches solid; flesh white, taste mild; spores narrowly elliptic or oblong, rusty brown or subcinnamon, .0003–.0004 of an inch long, .00016–.0002 broad.

"The grapelike clavaria is very closely related to the red tipped clavaria and probably has been confused with it. It may be separated from that species by its thinner stem, the fading or evanescent character of the color of the ultimate branchlets and by its shorter and differently colored spores. The tips of the branches in mature or old plants are whitish like the branches

themselves, but often a few small branches may be found near the base of the plant which have red tips and are therefore presumably of later development. It is possible that these two clavarias have been confused in Europe for European mycologists do not agree in their description of the spore characters of the red tipped clavaria. Stevenson describes them as subhyaline, 12–15 μ long, 6 μ broad. Massee describes them as white, 8 μ long, 5 μ broad. In our plant the spores in mass have a rusty brownish or subcinnamon color when collected on white paper and they are 8–10 μ long, 4–5 μ broad.

"The plants are 2–4 inches tall and 1.5–3 inches broad. They grow in thin woods on rather poor soil and may be found in August and September. The edible qualities seem to me to be similar to those of the red tipped clavaria."

Ground in woods. Massachusetts, New York, South Carolina, and Idaho. July and August. Edible.

The fructifications of the type are now cream color, everywhere except the tips of the ultimate branches which are ocher red; spores only very slightly colored or nearly hyaline as seen with the microscope, becoming minutely rough, 9–11×3–4 μ, not striate. Peck's statement concerning the spores of *C. botrytis* presents the confusion in the characters of European species—frequently due to errors by Massee, as in this instance—which is a serious obstacle to progress in American mycology. Constructive work such as that by Cotton and Wakefield prepares the way for advances in other countries.

Specimens examined:

Exsiccati: Ell. & Ev., N. Am. Fungi, 2022, under the name *C. botrytis;* Ravenel, Fungi Car. **2**: 41, under the name *C. botrytis;* Shear, N. Y. Fungi, 57, under the name *C. botrytis.*

Massachusetts: Andover, *J. Blake,* comm. by P. L. Ricker.

New York: Alcove, *C. L. Shear,* in Shear, N. Y. Fungi, 57; Port Jefferson, *C. H. Peck,* type, in N. Y. State Mus. Herb.

South Carolina: Aiken, *H. W. Ravenel,* in Ell. & Ev., N. Am. Fungi, 2022, and in Ravenel, Fungi Car. **2**: 41.

Idaho: Mt. Baldy, *E. B. Payson, 2363* (in Mo. Bot. Gard. Herb., 57356).

3. **C. conjuncta** Peck, N. Y. State Mus. Bul. **105**: 16, 42-43. *pl. 102. f. 1-3.* 1906; Sacc. Syll. Fung. **21**: 426. 1913.

Plate 1, fig. 3.

Type: in N. Y. State Mus. Herb.

"Stems united at the base, forming tufts 3–5 inches tall and nearly as broad, fragile, solid, glabrous, white or whitish, divided above into numerous erect, crowded, solid branches which are whitish or pale buff, ultimate branchlets terminating in two or more blunt points which are pale pink, sometimes with a yellowish tinge; flesh white, taste mild; spores dingy yellow in a thin stratum, subochraceous in a thick one, oblong, .0004–.0005 of an inch long, .00016–.0002 broad.

"The conjoined clavaria is a large tufted and attractive species closely related to *Clavaria flava* on one hand and to *C. botrytoides* on the other. From the first it may be distinguished by the pinkish tips of the branchlets, from the second by their paler color and greater permanence and from both by the larger spores. It is similar to both in its fragile tender flesh and pleasant flavor. It grows among fallen leaves in woods. It was found at Bolton Landing, Warren Co. which yet remains its only known locality."

The fructifications comprising the type are now Isabella-colored except at tips of branches, which are light ochraceous-salmon; the branches have dried longitudinally rugose and channelled; spores slightly colored under the microscope, nearly hyaline, minutely rough, 9–11×3½–4 μ.

The tips of the branches are a little paler in their dried condition now than those of the type of *C. botrytoides,* but the two type specimens are not otherwise distinguishable in their present dried condition; perhaps field studies may show good, distinctive characters.

Specimens examined:

New York: Bolton Landing, *C. H. Peck,* type, in N. Y. State Mus. Herb.

4. **C. holorubella** Atkinson, Ann. Myc. **6**: 57. 1908; Sacc. Syll. Fung. 21: 425 1912. Plate 2, fig. 6.

Type: in Cornell Univ. Herb.

"Plants 18 cm. high, spread of branching 12 cm. Trunk stout, 3 cm. in diameter, rooting, trunk with several stout branches which branch repeatedly, upper axils somewhat rounded. Entire plant reddish to madder brown, trunk deeper red than the branches; flesh reddish. Where spores are being developed surface covered with a whitish bloom. Basidia 4-spored. Spores

very pale yellow under the microscope, suboblong, slightly sigmoid in side view, smooth, 11–13×3–4.5 μ. Odor suggests that of water cress. - C. U. herb., No. 19979, and 19979a, Chillicothe, Ohio, rec'd Sept. 18, and Oct. 2, 1906, M. E. Hard."

The original specimen, No. 19979, is now tawny olive in the herbarium and discolored rather extensively sepia; the whitish bloom of the fresh specimens has become lost in drying, and also the odor of water cress; the spores are slightly colored in a microscopical preparation, flexuous, outline entire, surface obliquely striate, 12–13×4–4½ μ.

5. **C. obtusissima** Peck, N. Y. State Mus. Bul. **167**: 39. 1913.
Plate 4, fig. 18.

Type: in N. Y. State Mus. Herb.

"Much branching from a short thick whitish stem, the branches curving, dividing irregularly, enlarged above and divided into several blunt, wrinkled ends, longitudinally wrinkled, ochraceous, flesh white, taste mild; spores ochraceous in mass, oblong or subcylindric, 12–16×5–6 μ.

"Plant 10–12 cm. tall, 6–10 cm. broad.

"Woods of deciduous trees. West Roxbury, Mass. September. Miss Ann Hibbard."

The fructification grew on the ground, and is now between pinkish buff and cinnamon-buff, with ends of many of the branches, but not all, discolored to olive-brown, longitudinally wrinkled, and flattened in drying; spores somewhat colored, even, flexuous, 12–14×3½–4½ μ. I found no spores more than 4½ μ thick.

This species is noteworthy by the stout, loosely arranged main branches which are without subordinate lateral branches for nearly 2 centimeters and then dichotomously branched into terminal branches having thickened, obtuse ends.

6. **C. formosa** Persoon, Comment. Clav. 41. 1797; Icones et Descr. Fung. 11. *pl. 3. f. 5.* 1798; Syn. Fung. 585. 1801; Myc. Eur. **1**: 162. 1822; Fries, Syst. Myc. **1**: 466. 1821; Hym. Eur. 671. 1874; Peck, N. Y. State Mus. Rept. **32**: 36. 1879; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 173. 1919.
Plate 2, fig. 7.

Illustrations: Persoon, Icones et Descr. Fung. *pl. 3. f. 5;* McIlvane, Am. Fungi, *pl. 139, f. 3.*

Fructifications large, about 15 cm. in diameter, gregarious, much branched, very fragile, color pinkish buff, pale at first but deeper later, the tips of the branches yellowish or very slightly tinged with pink, every part turning violet and finally black when bruised; taste slight, smell none; stem white at first, then deep pinkish buff, rooting base absent; branches erect, cylindric or flattened, elongated, distinctly grooved, 1 cm. thick below, 2 mm. above, apices blunt; flesh white, solid; a few latex hyphae present; basidia with 4 sterigmata; spores pale colored, ochraceous in the mass, minutely granular, nearly even, 9–11 $\times 5\,\mu$.

On the ground under beech trees.

Cotton and Wakefield add further: "*C. formosa* is a large, very fragile plant, differing from *C. botrytis* in the fact that the apices of the branches are yellowish, or at most slightly tinged pinkish, and in the granular, not striate spores. It is distinguished from *C. flava* and *C. aurea* by the pinkish buff color, which is somewhat like that of *C. stricta*."

C. formosa has been reported from New England and North Carolina by Berkeley & Curtis and by Atkinson, from New York by Peck, from New Jersey and Pennsylvania by McIlvane, and from Ohio by Morgan and by Hard, but in no instance has it been recorded that the specimens met the European test of turning violet and finally black when bruised.

7. C. flava Schaeffer, Icones Fung. *pl. 175.* 1763; Persoon, Comment. Clav. 43. 1797; Syn. Fung. 586. 1801; Myc. Eur. **1**: 162. 1822; Fries, Syst. Myc. **1**: 467. 1821; Hym. Eur. 666. 1874; Sacc. Syll. Fung. **6**: 692. 1888; Peck, N. Y. State Mus. Rept. **24**: 81. 1872, and **48**: 210. *pl. 39. f. 1–4.* 1896; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 169. 1919.

Plate 4, fig. 19.

Illustrations: Schaeffer, *loc, cit.;* Peck, *loc. cit.*

Fructifications large, branched, 8–13 cm. high, fleshy, fragile, ochraceous, becoming paler on drying and reddish when bruised; smell pleasant, taste mild; stem thick, white or tinged reddish; branching irregular or irregularly dichotomous, repeated, axils acute, not flattened; branches slender, cylindrical, erect, solid, smooth or slightly wrinkled, apices blunt or pointed; basidia with 4 sterigmata; spores pale ochraceous in the mass, almost hyaline by transmitted light, narrowly elliptical, incurved at the base,

walls slightly granular, 11–14×4–5 μ.

Cotton and Wakefield add further: "It is found in both coniferous and frondose woods (especially beech) where it occurs either isolated or in groups as a pale fragile plant with a marked tendency to become reddish at the base or when bruised. The color is pale ochraceous, paler and yellower than in *C. formosa*, which has a tendency to become dull pink.

"The correct identity of the three species, *C. flava* Pers., *C. formosa* Pers., and *C. aurea* Fr. is a very perplexing problem and one which owing to the scarcity of authentic material and the meagerness of the original descriptions it is perhaps impossible to solve. There can be little doubt that the plant here referred to as *C. flava* is the same as that described by Persoon under the same name, and in this view we have the support of Maire (loc. cit.). In this country it has been usually referred to as *C. aurea*, an error which arose largely as a result of Fries' statement that *C. aurea* differed from *C. flava* in its ochraceous spores. This was incorrect, as in all the species of this section the spores are colored, though in some species more so than in others."

C. flava has been reported from all parts of the United States by mycologists who have followed Fries' statement as to color of spores for distinguishing between this species and *C. aurea* and have left no record of color changes where the specimens were bruised.

8. **C. aurea** Schaeffer, Icones Fung. *pl. 285, 287.* 1763; Fries, Epicr. 574. 1838; Hym. Eur. 670. 1874; Sacc. Syll. Fung. **6**: 699. 1888; Morgan, Cincinnati Soc. Nat. Hist. Jour. **11**: 88. 1888; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 170. 1919.

Plate 3, fig. 12.

Trunk thick, elastic, pale, divided into stout, tense and straight, very dichotomously branched, round, obtuse, somewhat toothed, yellow branches.

On the ground in pine woods.

C. aurea has been reported from various parts of the United States on the basis of the foregoing too brief description. Future gatherings which seem referable here by close agreement with this description and with the reproduction of the original illustration and which disagree with characters of the other better-known species here described, should be carefully studied, preserved, and their characters fully described. In the several series of Euro-

pean exsiccati in the Missouri Botanical Garden Herbarium there are no specimens labelled *C. aurea.*

Concerning *C. aurea* in Great Britain, Cotton and Wakefield state: "With regard to *C. aurea* it is difficult to dogmatise as to its identity. The English specimens so named consist as stated above for the most part of *C. flava,* but a few which as far as can be seen from herbarium material only differ in possessing shorter spores may be distinct also in other characters, and these may possibly represent the *C. aurea* of Fries. Until the Swedish species of *Clavaria* have been critically worked out it is advisable not to attempt to describe the plant or list the species for Britain."

9. C. densa Peck, N. Y. State Mus. Rept. **41**: 79. 1888; Sacc. Syll. Fung. **9**: 249. 1891. Plate 2, fig. 9.

Type: in N. Y. State Mus. Herb.

"Tufts 2 to 4 in. high, nearly as broad, whitish or creamy-yellow, branching from the base; branches very numerous, nearly parallel, crowded, terete, somewhat rugose when dry, the tips dentate, concolorous; spores slightly colored, subelliptical, .0003 to .0004 in. long, .0002 to .00034 broad.

" Ground in woods. Selkirk. August."

The type specimen has no single prominent trunk but instead a cluster of equal trunks start from the ground and are closely crowded together; the color is now between cream-buff and pinkish buff throughout; spores slightly colored, minutely rough, 8–10×4½–5 μ.

10. C. densissima Peck, Torr. Bot. Club Bul. **30**: 98. 1903; Sacc. Syll. Fung. **17**: 193. 1905. Plate 1, fig. 5.

Type: in N. Y. State Mus. Herb.

"Tufts 7–10 cm. high, nearly as broad, very dense, closely and intricately branched from the base, the branches solid, white within, often compressed, very crowded, repeatedly and irregularly branching, sometimes anastomosing, pale ochraceous when dry, the ultimate branches more or less compressed and dilated, terminating in two or more blunt or pointed whitish tips; spores naviculoid, often uninucleate, 8–10 μ long, 4–5 μ broad; mycelium whitish.

"Much-decayed vegetable matter in mixed woods. Greenville, Michigan. October. B. O. Longyear. Near *C. densa* and *C.*

condensata, but from the latter it differs in color and from the former in its more compact mode of growth, compressed branches, more narrow spores, and in having the tips of the branches differing in color from the branches themselves. The branches appear glabrous to the naked eye, but under a lens they have a minutely velvety appearance. This indicates a relationship to the genus *Lachnocladium,* but it is not clearly shown by the dried specimens that the texture is coriaceous."

The type fructification is now everywhere chamois colored; it has the cluster of main stems and all branches except the small terminal branchlets anastomosing and grown together at points of contact from the base upward in a highly characteristic manner; spores ochraceous where occurring as dust in axils of the branches, somewhat colored under the microscope, minutely rough, 9×4 μ. The fructification grew from the ground but partially inclosed a piece of wood which was in its way, and shows transversely across the lower part of the fructification in the illustration.

11. C. fumigata Peck, N. Y. State Mus. Rept. **31**: 38. 1879; Sacc. Syll. Fung. **6**: 711. 1888. Plate 2, fig. 10.

Type: in N. Y. State Mus. Herb.

"Stem short, thick, branching from near the base, whitish; branches numerous, forming a dense mass, smoky-ochraceous, sometimes tinged with lilac; tips obtuse; spores .0003′–.0005′ long.

"Ground in woods. Ticonderoga. Aug.

"The tufts are 4′–5′ high and remarkable for their smoky or dingy color."

The type fructifications are now drab to hair-brown; spores copious, colored, distinctly rough, 9–10×4–4½ μ. *C. fumigata* is a species well marked by its form, size, color, and spores.

12. C. grandis Peck, Torr. Bot. Club Bul. **29**: 73. 1902; Sacc. Syll. Fung. **17**: 195. 1905. Plate 3, fig. 13.

Type: in N. Y. State Mus. Herb.

"Stem stout, distinct, radicating, divided above into numerous long, erect or slightly diverging branches which are repeatedly branched, solid but very fragile, glabrous, reddish-brown with white tips at first, becoming somewhat pulverulent and ferruginous brown with concolorous tips when old, somewhat fragrant;

spores ferruginous, broadly elliptic or subglobose, distinctly verrucose, 10–12 μ long, 6–8 μ broad.

"Plant 12–20 cm. high, nearly as broad above; stem 2–2.5 cm. thick.

"Thin woods under *Smilax* bushes. Maryland. September. F. J. Braendle.

" According to Mr. Braendle this large *Clavaria* is edible when prepared as pickles and put up in spiced vinegar."

Fructification growing on the ground, radicated, now Dresden-brown to snuff-brown, discolored darker in a few places; basidia 2-spored; spores intensely colored, strongly echinulate, flattened on one side, the body of the spore 10–12×6–7 μ. In the N. Y. State Mus. Herbarium there are more recent collections referred by Peck to *C. grandis* which have fructifications of the same form but much smaller and with similar, characteristic spores. These additional specimens were collected in Massachusetts by S. Davis, and in Vaughn, New York, by S. H. Burnham.

C. grandis belongs in the group of which the other American species are *C. cyanocephala, C. spiculospora,* and *C. cervicornis.* The species of this group are alike in their intensely colored and strongly echinulate, beaked spores, but differ from one another in dimensions of spores and fructifications and in form and color of the latter. According to recent studies, which are cited in connection with *C. cyanocephala* Berk. & Curtis, *C. aeruginosa* Pat., *C. Zippelii* Lév., and *Thelephora acanthacea* Lév. of the East Indies are species of the same group and all need comparison with one another.

13. C. cyanocephala Berk. & Curtis, Linn. Soc. Bot. Jour. **10**:338. 1868; Sacc. Syll. Fung. **6**: 711. 1888. Plate 3, fig. 14.

Lachnocladium cyanocephala (Berk. & Curtis) Patouillard, Jour. de Bot. **3**: 35. 1889.—An *Clavaria aeruginosa* Patouillard, Soc. Myc. Fr. Bul. **14**: 189. 1898 ? See von Höhnel & Litschauer, K. Akad. Wiss. Wien Sitzungsber. **119**[1]: 394. 1910. —An *C. Zippelii* Léveillé, Ann. Sci. Nat. Bot. III. **2**: 215. 1844? See von Höhnel & Litschauer, *loc. cit.*—An *Thelephora acanthacea* Léveillé, Ann. Sci. Nat. Bot. III. **5**: 147. 1846 ? See von Höhnel & Litschauer, K. Akad. Wiss. Wien Sitzungsber. **122**: 278. 1913.

Type: from Cuba, *C. Wright, 261,* in Curtis Herb.

"Stipite subdiviso, ramis ramulisque furcatis sursum intense

caeruleis, apicibus breviter bifidis obtusis subfastigiatis.

"Among leaves in thick woods. June. Hab. Bonin Isles. About 3 inches high."

The specimen from Cuba, upon which the original description was based, is now brownish olive; spores coarsely echinulate, intensely colored, the spore body 10–13×6–8 μ.

14. **C. spiculospora** Atkinson, Ann. Myc. **7**: 368. 1909; Sacc. Syll. Fung. **21**: 426. 1912, as *C. spiculosperma.* Plate 2, fig. 11.

Type: an authentic specimen which was compared with the type is in Burt Herb. The type could not be found in Cornell Univ. Herb. although a photograph of it is present there.

"Plant about 6 cm. high, stem 5 cm. long, 0,8–1 cm. in diameter. Several short branches clustered at the top. Branches subdichotomous to subtrichotomous. Terminal branchlets coarsely dentate to subpyxidate, some of them resembling molars. Stem grayish brown, whitish below, the whitish part stained with pink or pale purple. Branches grayish brown, tips abruptly white. Spores reddish brown, a brick color, long, obovate and curved at the smaller end, covered with sharply pointed spicules, spicules being nearly 2 μ long. Spores 11–13×6,5–7,5 μ.—C. U. herb., No. 22638, ground, mixed woods, Chapel Hill, N. C., W. C. Coker, Oct. 08."

The authentic specimen in Burt Herb. was communicated to me by Professor Atkinson in 1911 together with his type for study and with inquiry whether known to me already as a *Thelephora.* This specimen seemed to me to be the same species as his type, but larger, more branched above; it is now buckthorn-brown; basidia 2-spored; spores intensely colored, strongly echinulate, with body 11–15×6–8 μ.

When collected again, the characters as to color of the fresh specimens should be compared with those recorded for *C. cyanocephala.*

15. **C. longicaulis** Peck, Torr. Bot. Club Bul. **25**: 371. 1898; Sacc. Syll. Fung. **16**: 206. 1902. Plate 2, fig. 8.

Type: in N. Y. State Mus. Herb.

"Stem slender, solid, sparingly and irregularly branched above, the branches rather long, simple or sparingly branched, the tips blunt, the whole plant dark brown when fresh, externally dark ochraceous when dry, longitudinally and somewhat irregularly

wrinkled; spores ochraceous, ovate or subelliptical, minutely roughened or echinulate, 6-7.5 μ long, 4-5 μ broad.

"Plant 3.7–5 cm. high; stem about 2.5 cm. long, 2.4 mm. thick.

"Moist ground. Alabama. July. Earle.

"A well-marked and peculiar species readily known by its long stem, uniform dark brown color fading externally in the dry plant to ochraceous and by the longitudinally wrinkled stem and branches."

The type specimen is now tawny olive everywhere, flattened, longitudinally wrinkled, and of rather equal diameter in all parts; at least some basidia with 4 sterigmata; spores intensely colored, finely echinulate, with spore body 6–8×4–5 μ. The spores are smaller and with smaller projections than those of the three preceding species.

16. **C. xanthosperma** Peck, N. Y. State Mus. Bul. 94: 21. 1905; Sacc. Syll. Fung. 21: 431. 1912. Plate 3, fig. 15.

Type: in N. Y. State Mus. Herb.

"Stem very short, firm, solid, divided into numerous branches, white, sometimes becoming red where wounded, ultimate branches short, blunt or obtusely dentate at the apex, the axils rounded, the whole plant white, becoming yellowish or cream-colored with age; spores pale yellow, oblong, .0005–.0006 of an inch long, .00016–.0002 broad, slightly and obliquely pointed at one end.

"Woods. Smithtown, Suffolk Co. August.

"It forms tufts about 2 inches high."

Inspection of the base of the fructifications indicates that they probably grew on the ground; the fructifications are now warm buff to cinnamon-buff; basidia with 4 sterigmata; spores in preparation appear colored in contrast with adjacent tissue, even, flexuous, 14×4 μ.

This species seems noteworthy by having a white fructification and colored spores; perhaps the yellowish or cream color assumed with age is due to maturing spores.

17. **C. albida** Peck, N. Y. State Mus. Rept. 41: 79. 1888; Sacc. Syll. Fung. 9: 249. 1891. Plate 3, fig. 16.

Type: in N. Y. State Mus. Herb.

"Plants 2 to 4 in. high, whitish; stem short, thick, generally tapering downwards, divided above into a few short, thick, much-

branched ramuli, ultimate branches densely crowded, terminating in a few short, blunt teeth; flesh firm, dry, whitish, taste tardily acrid, then bitter; spores oblong, pale ochraceous, .0005 to .0006 in. long, .0002 broad.

"Ground in thin woods. Menands. August.

"The species has the structure of *C. botrytis* and *C. flava*, but it is readily distinguished from these by its uniform whitish color, the tips of the branches being concolorous."

The four fructifications of the type are between avellaneous and tawny olive with the tips somewhat resinous colored; fructifications probably contracted greatly in drying for they are now longitudinally rugose and channelled; spores slightly colored, even, flexuous, 12–15×4–5 μ.

18. **C. secunda** Berk. & Curtis, Grevillea **2**: 7. 1873; Sacc. Syll. Fung. **6**: 702. 1888. Plate 1, fig. 4.

Type: in Curtis Herb. and in Kew Herb. probably.

"Caudice crassiusculo cito diviso; ramis curvatis secundis; apicibus apiculatis. No. 534. Car. Sup. No. 991. Santee River.

"Pale yellow; stem moderately thick, soon divided, branches curved, all leaning one way, tips shortly divided, apiculate; spores yellow. *C. spinulosa*, Schwein. Herb."

As shown in the photograph, the stem is very short and soon divided into the branches; the fructification is now everywhere snuff-brown but this may be due in some degree to the specimen having been treated at some time with a fluid, probably for poisoning, which dissolved matter so that the paper on which the specimen is mounted is stained about the fructification; spores ochraceous where occurring as powder in axils of the branches, pale colored under the microscope, barely rough but not showing spines, 10–13×3½–4½ μ.

19. **C. crassipes** Peck, N. Y. State Mus. Bul. **67**: 27. 1903; Sacc. Syll. Fung. **17**: 195. 1905. Plate 7, fig. 51.

Type: in N. Y. State Mus. Herb.

"Stem thick, firm, solid or sometimes with a cavity at the base, glabrous white or whitish, repeatedly branched above, the branches very numerous, crowded, solid, terminating in obtuse or obtusely dentate tips, whitish or sligthly yellowish; spores oblong, uninucleate, .0006–.0007 of an inch long, .00025–.0003 broad, with an oblique apiculus at the base.

"Plant 3–6 inches high, 2–4 inches broad in the widest part, with the short stem about 1 inch thick. In woods and groves. Sandlake. August.

"The flesh of the stem when cut or broken slowly assumes a smoky brown color."

Fructification now tawny olive; spores pale colored, barely rough under immersion objective, flexuous, 13×4–4½ μ.

The type of *C. crassipes* has a thicker stem than that of *C. secunda* but is very similar in other characters.

20. **C. testaceoflava** var. **testaceoviridis** Atkinson, Ann. Myc. **6**: 58. 1908; Sacc. Syll. Fung. **21**: 427. 1912. Plate 3, fig. 17.

Type: in Cornell Univ. Herb.

"Plants clustered, extreme bases slightly joined; tufts 4–5 cm. high, 3–4 cm. broad; trunks short, 1–2 cm. high, 4–6 mm. stout, above abruptly branched, terminal branches somewhat enlarged and pluridentate; trunks and branches pale drab, tips olive green when fresh; spores oblong, roughened, 10–12×4 μ.–C. U. herb., No. 10593, ground, woods, Blowing Rock, N. C., A. B. Troyer, Aug. 19–Sept. 22, 1901."

The fructification is now everywhere fuscous, and the smaller branches longitudinally rugose; spores slightly colored, rough, 10–12×4–4½ μ.

21. **C. abietina** Persoon in Roemer, Neues Mag. Bot. **1**: 117. 1794; Comment. Clav. 46. 1797; Syn. Fung. 588. 1801; Myc. Eur. **1**: 164. 1822; Fries, Syst. Myc. **1**: 469. 1821; Hym. Eur. 671. 1874; Sacc. Syll. Fung. **6**: 701. 1888; Morgan, Cincinnati Soc. Nat. Hist. Jour. **11**: 89. 1888; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 174. 1919. Plate 5, fig. 28.

Illustrations: Cooke, Handb. **1**: 330. *text f. 88;* Fl. Dan. *pl. 2030, f. 2;* Greville, Crypt. Fl. *pl. 117;* Hard, Mushrooms, *text f. 390;* Patouillard, Tab. Anal. Fung. *f. 566.*

Plants much branched, forming spherical tufts 3–5 cm. high, tough, deep dull ochraceous in color, becoming greenish when bruised; smell strong, taste bitter; stem short, thick, whitish, downy, with a slightly rooting base, becoming greenish; branches slender, 1–2 mm. thick, erect, repeatedly forked, cylindrical or compressed, longitudinally wrinkled when dry, apices pointed or bifid, axils acute; basidia with 4 sterigmata; spores deep ochraceous in the mass, copious, finely rough, pip-shaped, 7–10×3–5 μ (average 7–8×3–5 μ).

On the ground in coniferous woods.

The above is based on the description by Cotton and Wakefield, who add further: "Distinguished from all other British species by turning green when bruised." In working with American gatherings the bitter taste of European specimens should be kept in mind and noted if detected; the spores are glued together in small masses in the specimens from Germany in the exsiccati cited below, and the trunk is short and soon branched in these specimens and in the European illustrations of the species. *C. abietina* has been reported from Ohio by Morgan and by Hard.

Specimens examined:

Exsiccati: Klotzsch, Fungi Germ., 43; Lindhart, Fungi Hung., 51; Rabenhorst, Herb. Myc., 314; de Thümen, Myc. Univ., 410.

22. **C. flavula** Atkinson, Ann. Myc. **6**: 56. 1908; Sacc. Syll. Fung. **21**: 428. 1912. Plate 4, fig. 20.

Type: in Cornell Univ. Herb.

"Plants buff yellow arising from a tough and thick subiculum which produces many stems which branch many times dichotomously, are flexuous and end in minute, pointed tips. The whole plant is tough. Spores pale yellow, oblong, smooth or some very slightly roughened, 9–12×3–3,5 μ.—C. U. herb., No. 14113, on leaves (pine and oak) Fall Creek bank below Chemical building, C. U. Campus, Ithaca, N. Y., C. Thom., Oct. 22, 1902."

The fructifications are soft and tender when moistened and of rather dry composition, now everywhere pinkish buff to warm buff; the subiculum upon which the many fructifications stand is a mycelium composed of interwoven hyphae which covers, and whose strands are incorporated in, a mass of pine needles; spores slightly colored, minutely rough, about 10×4 μ.

This species is noteworthy by the grouping of the fructifications on a subiculum, dichotomous branching of the slender fructifications, buff color, and rough spores.

23. **C. leucotephra** Berk. & Curtis, Grevillea **2**: 7. 1873; Sacc. Syll. Fung. **6**: 712. 1888. Plate 4, fig. 21.

Type: in Curtis Herb. and probably in Kew Herb.

"Caudice communi crassiusculo, ramis strictis apicibus furcatis acutis brunneis basi albo-tomentosis. No. 6362. Car. Amongst fallen leaves.

"About 2 inches high, with the thickish common base; branches straight, forked and apiculate at the tips, tomentose below."

The type specimen in Curtis herbarium is now fragmentary, consisting of the main trunk and bases of branches and fragments of some branches, with all parts colored clove-brown; dried trunk strongly longitudinally furrowed, now showing none of the tomentose covering at the base; spores colored, minutely rough, 9–10×3½–4½ μ. Sections mounted on the sheet with the type show the hymenial surface free from hairs, cystidia, etc. The fluid used in poisoning the specimen has dissolved a pigment from the fructification and stained the herbarium sheet dark brown in the vicinity of the specimen. The type specimen was collected at Hillsborough, North Carolina.

The main stem is suggestive of the stem of *C. spiculospora* and *C. grandis* but these species have the spores more intensely colored, strongly echinulate, and larger.

24. **C. flavobrunnescens** Atkinson, Ann. Myc. 7: 367. 1909; Sacc. Syll. Fung. 21: 427. 1912. Plate 4, fig. 22.

Type: in Cornell Univ. Herb.

"Plants very much branched, 5–7 cm. high, 4–6 cm. broad. Trunk short or entirely absent. In latter case branches arising from extreme base. Trunk when present, 0,5–1 cm. in diameter. Primary branches stout, 4–8 mm. in diameter. Branches repeatedly dichotomous. Axils usually rounded or arcuate. Branches sometimes anastomosing, more or less flexuous. Tips minutely dentate. Color uniform yellow except extreme base which is white. Plants very brittle, bruises turn brown and become water soaked. Spores yellow, subelliptical, pale yellow under microscope, minutely roughened 7–9×3 μ.—C. U. herb., No. 22639, ground, woods, Battle's Park, Chapel Hill, N. C."

The original specimen has become in the herbarium tawny olive, more or less discolored olive-brown, now odorless, not noteworthy by anastomosis of the branches, tips of branches notably dentate; spores are an ochraceous powder in some places on surface of fructification, colored under the microscope, minutely rough, 7–9×3½–4 μ.

C. flavobrunnescens and *C. leucotephra* were both described from collections made in North Carolina; the original specimens agree in color, spore characters, and characters of the stems.

Perhaps *C. flavobrunnescens* may be a synonym of *C. leucotephra.*

25. **C. stricta** Persoon, Usteri Ann. Bot. **15**: 33. 1795; Comment. Clav. 45. *pl. 4. f. 1.* 1797; Syn. Fung. 588. 1801; Myc. Eur. **1**: 163. 1822; Fries, Syst. Myc. **1**: 468. 1821; Hym. Eur. 673. 1874; Berkeley, Outl. Brit. Fung. 281. *pl. 18. f. 5.* 1860; Sacc. Syll. Fung. **6**: 705. 1888; Peck, N. Y. State Mus. Rept. **22**: 87. 1869; Morgan, Cincinnati Soc. Nat. Hist. Jour. **11**: 89. 1888; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 174. 1919. Plate 4, fig. 23.

C. stricta var. *fumida* Peck, N. Y. State Mus. Rept. **41**: 86. 1888. Plate 5, fig. 29.

Illustrations: Persoon, *loc. cit.;* Berkeley, *loc. cit.*

Fructifications branched, 3–5 cm. high, gregarious, tough, ochraceous, tinged with vinous (or pale pinky buff), apices pale yellow; smell strong, spicy, taste bitter; stem distinct, thick, short, tough, with root-like strands of white mycelium at base; branching irregularly dichotomous, axils acute; branches slender, cylindric or sometimes compressed, erect, attenuated, the apices somewhat pointed, solid, slightly incurved; basidia 4-spored; spores ochraceous in the mass, almost hyaline by transmitted light, pip-shaped, almost even, 7–10×3–5 μ.

On rotten wood—sometimes, at least, of frondose species. Maine to Idaho. September and October. Probably common and widely distributed.

This species is distinguished by its occurrence on rotten wood, white, cord-like mycelium, and bitter taste.

C. stricta var. *fumida* Peck, *loc. cit.,* was described as follows: "The whole plant is of a dingy, smoky-brownish hue. Otherwise as in the typical form. Catskill mountains. September. In the fresh state the specimens appear very unlike the ordinary form, but in the dried state they are scarcely to be distinguished."

Fig. 29 is from a photograph of the type of var. *fumida;* this fructification is now clay color for the region of the smaller branches, a little darker towards the base; spores colored, slightly rough, 8×4 μ. There seems little reason for not merging this proposed variety with the species.

26. **C. acris** Peck, N. Y. State Mus. Rept. **54**: 155. *pl. H. f. 37–39.* 1901; Sacc. Syll. Fung. **21**: 426. 1912. Plate 5, fig. 30.

Type: in N. Y. State Mus. Herb., and part of type collection in Burt Herb.

"Stem short, branching from near the base, the branches repeatedly and subpalmately branched, sometimes compressed, tough, solid, reddish incarnate, whitish within, tips acute, whitish or concolorous, the axils often rounded; taste acrid; mycelium white; spores broadly elliptic, pale ochraceous, .00024–.0003 of an inch long, .00016–.0002 broad.

"Much decayed wood of coniferous trees. Floodwood. August. It forms tufts 1.5–3 inches high and nearly as broad."

When fresh the fructifications were between capucine-orange and cinnamon buff and slowly acrid to the taste, they have become pinkish buff in the herbarium and lost the acridity; spores slightly colored under the microscope, minutely rough, 6–7× 4–4½ μ.

C. acris differs from *C. stricta* by the acrid taste and slightly smaller spores.

27. **C. tsugina** Peck, N. Y. State Mus. Bul. **67**: 27. 1903; Sacc. Syll. Fung. **17**: 196. 1905. Plate 5, fig. 31.

Type: authentic specimen collected at Piseco, Adirondack Mountains—probably the type—in N. Y. State Mus. Herb.

"Stem very short, glabrous, branching from the base, solid, the branches few or many, suberect, sometimes crowded, flexible, rather tough, solid, terminating in acute tips; young plants and growing tips creamy yellow, older parts and mature plants vinaceous cinnamon or reddish brown; spores ochraceous, elliptic, .0003 of an inch long, .00016 broad.

"Plants 1–3 inches high, nearly as broad in the widest part. Prostrate, decaying trunks of hemlock, *Tsuga canadensis*. Adirondack mountains. July and August. Closely allied to *C. abietina*, from which it differs in its naked stem, in having no bitter flavor and in wounds not assuming a green color."

The hymenial portions are now cinnamon-brown and portions of the trunk and axils cream-buff; spores slightly colored, minutely rough, 8–9×3–4 μ. Peck did not record absence of acridity for this species, but, unless not at all acrid, the species seems not distinguishable from *C. acris*.

28. **C. cervicornis** A. L. Smith, Linn. Soc. Bot. Jour. **35**: 10. 1901; Sacc. Syll. Fung. **17**: 194. 1905.

Type: probably in Herb. of Brit. Mus.

"Lignicola, 8 cm. alta, basi simplici, subtereti, 2 cm. alta; ramis subdichotomis, supra dumosis, compressis, siccitate sulcatis; planta tota carnea, dein cinnamomea, velutino-pruinosa; sporis ellipticis, echinulatis, flavido-brunneis, 6 μ×8 μ.

"Growing in clumps on rotten wood, Prince Rupert's [Dominica, W. I.], March 1894. No. 917.

"Among rotten leaves, St. Aroment, Aug. 1892. No. 419.

"The flattened branches and the brownish echinulate spores seem to indicate *Thelephora* rather than *Clavaria* for this species, but the hymenium covers the whole surface of the plant and necessitates the placing of it in the latter genus."

I have seen no specimen of this species; the colored, echinulate spores seem to show relationship with the *C. cyanocephala* group of species, from all of which this differs in the subglobose spores and occurrence on wood.

29. C. pinicola Burt, n. sp. Plate 5, fig. 32.

Type: in Mo. Bot. Gard. Herb.

Fructifications rarely solitary, usually in clusters of 2–6 from a common white mycelium, slender, of rather uniform diameter throughout, sometimes simple but usually once to thrice dichotomously forked, the branches cylindric, spreading, drying everywhere buffy brown, the apices acute; spores slightly colored under the microscope, even, 7½–9×4½–5 μ.

Fructifications 1–3 cm. long, trunk and main branches 1/3–3/4 mm. in diameter.

On bark of log of *Pinus contorta*. Priest River, Idaho. Oct. 10, 1920. *J. R. Weir, 16946*, type (in Mo. Bot. Gard. Herb., 57689).

C. pinicola is very distinct from any other American species; it is related in aspect to *C. delicata* Fr., represented in Curtis Herbarium by an authentic specimen from Fries, which has hyaline spores 5–6×2½ μ. *C. delicata* is more fully described as No. 106 of the exotic species. *C. byssiseda* is of somewhat similar aspect but has hyaline spores 12–16 μ long.

30. C. brunneola Berk. & Curtis, Linn. Soc. Bot. Jour. **10**: 338. 1868; Sacc. Syll. Fung. **6**: 711. 1888. Plate 3, fig. 24.

Type: in Curtis Herb. and probably in Kew Herb.—Also distributed in Wright, Fungi Cubenses Wrightiani, 462.

"Helvola; stipite cylindrico tenui parce diviso; ramis 1–2 furcatis, ultimis longis obtusis cylindricis patentibus. [Cuba, C. Wright, 239.]

"On banks. November. About 1 inch high."

The fructifications are now drab, with all parts of rather uniform diameter and cylindric; spores slightly colored under the microscope, even, pointed at apex as well as at base, 13–15× 9–10 μ.

C. brunneola is noteworthy by its very large, pointed spores and by the small, few and divaricately branched fructifications. The tissue seemed rather dry and tough when moistened in making a preparation; perhaps this species should be transferred to *Lachnocladium* when characters of the specimens in vegetative condition are better known.

31. C. flaccida Fries, Syst. Myc. **1**: 471. 1821; Hym. Eur. 671. 1874; Icones Hym. **2**: 99. *pl. 199, f. 4.* 1884; Peck, N. Y. State Mus. Rept. **32**: 36. 1879; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 175. 1919. Plate 4, figs. 25, 26.

Illustrations: Fries, *loc. cit.*

Type: authentic specimen from Fries in Curtis Herb.

Fructifications branched, small, 3–4 cm. high, gregarious, rather tough but flaccid, bright ochraceous in color, tips paler, base whitish, does not turn green on bruising; smell and taste slight, pleasant; main stem very short, white, with white floccose mycelium; branches very crowded, repeatedly forked, erect, upper axils rounded, the pointed terminal branches usually curving inwards towards each other, solid; flesh white; basidia with 4 sterigmata; spores not copious, ochraceous, very finely punctate, pip-shaped, 6–8×3–5 μ (average 6–7×3 μ), sometimes with a hyaline basal tip.

Among moss and leaves in coniferous woods.

Cotton and Wakefield add further: "Somewhat resembling *C. abietina*, but the whole fungus is more flaccid and does not turn green when bruised. Stem sometimes up to 1.75 cm. long, at others almost obsolete. Mycelium whitish, creeping over leaves, etc."

The specimen from Fries in Curtis Herb., fig. 26, now between fuscous and mouse-gray, is composed of many closely arranged branches; spores copious, distinctly colored, distinctly rough, 6× 3 μ, glued together in small groups to a notable degree in the preparation.

32. C. pusilla Peck, Buffalo Soc. Nat. Sci. Bul. **1**: 62 Jl. 1873; N. Y. State Mus. Rept. **25**: 83. 1873; Sacc. Syll. Fung. **6**: 708. 1888. Plate 4, fig. 27.

Type: in N. Y. State Mus. Herb.

"Stem slender, solid, rather tough, much and irregularly branched; branches unequal, divergent; tips acute.

"Plant scarcely 1′ high, yellowish.

"Ground under spruce and balsam trees. North Elba. September.

"This plant is distinguished from *C. tetragona* by its terete stems and irregular ramification."

The fructification is now drab, with stem somewhat olive-buff; spores colored, minutely rough, 4½–6×2½–3 μ, glued together in small masses.

The photographs show the type of *C. pusilla* closely resembling in aspect the specimen of *C. flaccida* from Fries.

33. C. circinans Peck, N. Y. State Mus. Rept. **39**: 43. *pl. 1. f. 21–22.* 1886; Sacc. Syll. Fung. **6**: 704. 1888.

Plate 5, fig. 33.

Type: in N. Y. State Mus. Herb.

"Stem short, solid, dichotomously or subverticillately branched; branches slightly diverging or nearly parallel, nearly equal in length, the ultimate ones terminating in two or more short acute concolorous ramuli; spores ochraceous.

"Plant 1 to 2 in. high, obconic in outline, flat topped, appearing almost as if truncated, pallid or almost whitish in color, generally growing in imperfect circles or curved lines.

"Under spruce and balsam trees. Adirondack mountains. Aug."

Fructifications are now pinkish buff everywhere—the tint of *Coniophora polyporoidea,*—often rising from a whitish mycelium on the leaf mold and binding the particles of the latter together; basidia with 4 sterigmata; spores colored in the mass, nearly hyaline, minutely rough, flexuous, 7½–9×3–3½ μ.

I have collected this species near Silver Lake, Vermont. It has been distributed from New Hampshire in Reliquiae Farlowianae, No. 335.

34. C. flavuloides Burt, n. sp. Plate 5, fig. 34.

Type: in N. Y. State Mus. Herb. under the name *Clavaria subtilis.*

Fructifications up to 3 cm. high, gregarious, many times dichotomously branched, becoming pinkish buff in the herbarium, the branches very slender, drying compressed, curving together, with rounded axils; white mycelial strands at base of stems permeate the leaf humus and bind it together; spores copious, slightly colored under the microscope, 6×3 μ, slightly rough under an immersion objective.

Type: on coniferous leaf humus. North Elba, New York. Sept. 10, 1910. *C. H. Peck.*

This is *Clavaria subtilis* Pers. as understood by Peck, but *C. subtilis* has white spores according to European authors. *C. gracilis* Pers. is said by Fries to differ from *C. subtilis* in having ochraceous spores, and *C. flavuloides* may prove eventually a synonym of *C. gracilis* but since I can find only a vague description of the latter and no original illustration and no specimens in exsiccati, it seems best to give to the American gathering a distinct name. *C. flavuloides* has the general aspect of *C. flavula* but lacks the subiculum over the ground and has smaller spores.

35. C. fragrantissima Atkinson, Ann. Myc. **6**: 57. 1908; Sacc. Syll. Fung. **21**: 427. 1912. Plate 5, fig. 35.

Type: in Cornell Univ. Herb.

"Plants fragrant, pale ochraceous buff, very much branched dichotomously from a single trunk; tips 2–3, conic. Spores 4–5½ ×2½–3 μ, smooth, granular, only slightly tinged with yellow, subelliptical, pointed at side of one end.—C. U. herb., No. 13743, ground, Cascadilla woods, C. Thom., Sept. 22, 1902; No. 15323, ground under pine trees, Beebe Lake woods, Fall Creek, July 30, 1903, Thom., Ithaca, N. Y."

The fructifications are now cream-buff, not notably dichotomous but rather with a tendency to branch along one side of the fructification; prominent mycelial strands extend from base of the stem into the substratum; spores slightly colored, even as seen with usual 4-mm. objective but minutely rough when viewed in glycerine mount with oil-immersion objective, 4½–6× 2½–3 μ. The fragrant odor of the fresh specimens is no longer perceptible.

36. C. myceliosa Peck, Torr. Bot. Club Bul. **31**: 182. 1904; Sacc. Syll. Fung. **17**: 196. 1905. Plate 6, fig. 37.

Type: in N. Y. State Mus. Herb.

"Stem slender, solid, irregularly branched above, tawny, with an abundant mycelium which forms whitish, branching strands among decaying leaves and twigs; branches short, divergent or wide spreading with few branchlets, colored like the stem, the ultimate branchlets mostly acute, whitish; spores subglobose, 4 μ long. Scattered or gregarious, 1–2.5 cm. tall, stems about .5 mm. thick.

"Among fallen leaves and twigs under redwood trees. Mountains near Stanford University, California. December. E. B. Copeland.

"The abundant rhizomorphoid mycelium is a marked feature of this species. The plant is inodorous but has a slight peppery taste. It is allied to our eastern *C. pusilla*, but it is a smaller, more slender plant with the slender stem branched above only, and with the few short branches more widely spreading."

The fructifications are now Saccardo's umber, with conspicuous and numerous, whitish mycelial strands at the base ramifying among the humus of decaying redwood leaves; spores colored, rough, 4–4½×2½–3 μ, glued together in small masses.

This species is noteworthy by its slender form, branching above, prong-like branches, and peppery taste.

37. C. Kunzei Fries, Syst. Myc. **1**: 474. 1821; Hym. Eur. 669. 1874; Berkeley, Outl. Brit. Fung. 280. 1860; Peck, N. Y. State Mus. Rept. **24**: 81. 1872; Sacc. Syll. Fung. **6**: 697. 1888; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 177. 1919.

Plate 5, fig. 36.

C. chionea Persoon, Myc. Eur. **1**: 167. 1822.—See Cotton & Wakefield, *loc. cit.*

Illustrations: Quelet, Champ. Jura et Vosges 3:16. *pl. 2. f. 11.*

Fructifications 5–12 cm. high, branched, isolated or gregarious, brittle, ivory to creamy white, base sometimes pink; smell none, taste pleasant; stem usually distinct, 1–2 cm. long, 3–5 mm. thick, but sometimes absent; branching irregularly dichotomous or irregular, loose or rarely compact, the branches erect or spreading, cylindric or slightly compressed, often elongated, 2–5 mm. thick, even, solid, axils lunate, apices blunt or pointed; basidia with 4 sterigmata; spores hyaline, globose, even, 3½–4½ μ in diameter, minutely apiculate.

In long grass in woods and pastures.

Cotton and Wakefield comment further: "This species is very distinct in its beautiful ivory-white color and loosely branched habit. When well grown, it may form tufts 4 to 5 inches high and as much across, but average plants are decidedly smaller. From *C. rugosa* it is distinguished by being branched from the base and by the slender, even (not rugose) branches, and from *C. cristata* by the loose habit, lunate axils, and non-cristate branches. From both it differs in very small spores."

In gatherings in frondose woods among leaves from Vermont, New York, and Michigan, which I have studied, the spores are only about 3 μ in diameter.

38. C. arborea Atkinson, Ann. Myc. **6**: 56. 1908; Sacc. Syll. Fung. **21**: 432. 1912. Plate 6, fig. 38.

Type: in Cornell Univ. Herb.

"Plants very much branched dichotomously, curved and sometimes deformed, white to alutaceous, terminal branches rose pink, or yellowish brown probably when old. Basidia 4-spored. Spores obovate, asperulate, white, 3–4×2–3 μ.—C. U. herb., No. 13647, ground, woods north of Varna, N. Y. Whetzel, Aug. 21, 1902."

Fructification now between antique brown and cinnamon-brown, with trunk and main branches pinkish buff; branches not crowded, of rather uniform diameter; spores hyaline, mostly even—only very rarely by prolonged search may one be found obscurely asperulate—subglobose, 4–4½×3½–4 μ.

This seems very near *C. Kunzei*.

39. C. subcaespitosa Peck, N. Y. State Mus. Bul. **167**: 39. 1913 Plate 6, fig. 39.

Type: in N. Y. State Mus. Herb.

"Forming dense tufts 7.5–12.5 cm. tall, fragile, white or whitish, the stems united at the base, three to five times dichotomously divided, the terminal branchlets obtuse or subacute, both stems and branches solid, soft, becoming thinner and flattened or angular in drying, flesh white, taste mild; spores broadly ellipsoid or subglobose, 4–5×3–4 μ.

"Ground. Ellis, Mass. September. Mrs. E. B. Blackford and G. E. Morris. Communicated by Miss Ann Hibbard.

"This species may be separated from *Clavaria densa* Pk. by

its greater fragility, whiter color, softer texture and smaller spores. In the dried specimens the stems and branches are much more slender and of a purer white color than in *C. densa.*"

The type specimen is now cream color; spores white in the mass, hyaline under the microscope, minutely rough under a dry objective, minutely spinulose viewed with immersion objective, subglobose, 3½–4½×3–3½ μ. This species may be most surely separated from *C. Kunzei* by the rough spores; recent gatherings from the type locality, now in Mo. Bot. Gard. Herb. and Burt Herb., show furthermore that the outer surface of a cluster of the fructifications is composed of more numerous and finer ultimate branchlets than in *C. Kunzei.*

40. C. cristata Holmskiold ex Fries, Syst. Myc. **1**: 473. 1821; Sverig. Atl. Svamp. 53. *pl. 92. f. 1.* 1861; Hym. Eur. 668. 1874; Persoon, Syn. Fung. 591. 1801; Myc. Eur. **1**: 166. 1822; Berkeley, Outl. Brit. Fung. 280. 1860; Sacc. Syll. Fung. **6**: 695. 1888; Morgan, Cincinnati Soc. Nat. Hist. Jour. **11**: 87. 1888; Peck, N. Y. State Mus. Rept. 48: 211. *pl. 39. f. 8–12.* 1896; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 176. 1919. Plate 6, fig. 40.

Ramaria cristata Holmskiold, Fungi Dan. 92. *pl. 23.* 1799.

Illustrations: Holmskiold, Fries, Peck, *loc. cit.;* Persoon, Comment. Clav. *pl. 2. f. 4;* Hard, Mushrooms, *text f. 393.*

Fructifications 3–8 cm. high, gregarious, fragile, pure white, pinkish white or with a tinge of mouse-gray; smell none, taste distinct; flesh white; stem short, slender or stout; branches numerous, irregular, flattened upwards, and divided at the tips into sharp-pointed branchlets, axils rounded; basidia with 2 sterigmata; spores hyaline, even, apiculate, 9–12×6–8 μ (average 9×7, or 7–8 μ).

On ground in woods. Very common.

Cotton and Wakefield add further: "We have retained this species in the sense in which it is usually understood, but not without some misgivings. It is obviously nearly allied to *C. cinerea,* and small crested forms of the latter are difficult to distinguish from certain forms of *C. cristata.* It is noteworthy also that *C. cristata* usually occurs in more shaded spots, and frequently covered with leaves or screened by logs of wood."

41. C. mutans Burt, n. sp. Plate 6, fig. 41.

Type: in N. Y. State Mus. Herb. under the name *C. Krombholzii.*

Fructifications cespitose, 3–4 cm. high, branched 2 or 3 times, white, drying antimony yellow and somewhat longitudinally rugose, the apices usually acute; spores hyaline, even, subglobose, 7×6 μ.

On ground. Delmar, New York. *C. H. Peck,* type.

The above description is made on dried specimens which are what Peck understood as *C. Krombholzii.* The original description of the latter was made by Fries for some figures by Krombholz of what the latter understood as *C. Kunzei* Fr. For the present European opinion of *C. Krombholzii,* see Cotton & Wakefield, *loc. cit.,* p. 198. *C. mutans* is intermediate between *C. rugosa* and *C. cristata,* having coloration and spore characters of *C. rugosa* and some resemblance in aspect to *C. cristata.*

42. C. rugosa Bulliard, Herb. de la France, *pl. 448, f. 2.* 1789; Fries, Syst. Myc. **1**: 473. 1821; Hym. Eur. 669. 1874; Sacc. Syll. Fung. **6**: 696. 1888; Peck, N. Y. State Mus. Rept. **28**: 53. 1879; Morgan, Cincinnati Soc. Nat. Hist. Jour. **11**: 87. 1888; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 185. 1919.

Plate 6, fig. 42.

Illustrations: Bulliard, *loc. cit.;* Cooke, Brit. Ed. Fungi, *pl. 9. f. 32;* Patouillard, Tab. Anal. Fung. *f. 38;* Quelet, Champ. Jura et Vosges 1. *pl. 20. f. 5;* Krombholz, Nat. Abbild. u. Beschr. Schwämme *pl. 54. f. 13–17,* and *pl. 53. f. 14–17* (type of *C. Krombholzii*); other references in Sacc. Syll. Fung. **19**: 328.

Fructifications simple or slightly irregularly branched, solitary or gregarious, 5–10 cm. high, white or pallid, rather tough, thickened upwards, up to 1 cm. thick, longitudinally wrinkled, solid, apex blunt, basidia with 2 sterigmata; spores hyaline, even, subglobose, 9–11×8–9 μ, or 9–10 μ in diameter.

On ground in woods. Common.

Cotton and Wakefield add further: "This species varies in habit from simple to very branched forms, and the surface may be exceedingly rugose to almost smooth. It is generally recognizable, however, by the distinct, irregular, longitudinal wrinkles and the large spores."

American specimens which I have seen are only about half as large as stated above, and they assume in the herbarium an antimony yellow color which is helpful in recognizing at sight dried specimens of unusual forms of this species; the spores are

also a little smaller in the American gatherings than the dimensions given above.

43. C. rufipes Atkinson, Ann. Myc. **6**: 57. 1908; Sacc. Syll. Fung. **21**: 430. 1912. Plate 6, fig. 43.

Type: in Cornell Univ. Herb.

"Plants entirely white, base of stem tinged rufous, about 2 cm. high, branched like *Clavaria muscoides,* tips blunt and slightly enlarged. Basidia 4-spored. Spores oboval, granular then with an oil drop, smooth, 4–6×2,5–3 μ.—C. U. Herb., No. 14037, ground, Six Mile Creek, Ithaca, N. Y. Whetzel, Oct. 10, 1902."

Stem branched at apex into filiform branches which are now resinous (nearly Sayal brown), the stem tapering downward, now paler than the branches; spores hyaline, even, 4–6×3–4 μ.

C. rufipes is sharply distinct from the other white species by its small size, form suggestive of the fresh water hydra, and small spores. *C. exigua,* our other small species, was described as having a white stem and branches somewhat lavender.

44. C. asperula Atkinson, Ann. Myc. **6**: 54. 1908; Sacc. Syll. Fung. **21**: 430. 1912. Plate 6, fig. 44.

Type: in Cornell Univ. Herb.

"Plants branched from the base often forming broad tufts, 1–4 cm. high, tufts 1–4 cm. broad, entirely white, sometimes after drying becoming more or less discolored, brownish etc., axils of branches rounded, branches more or less divergent or arcuate; tips divergent or arcuate, acute; base of trunk often tomentose. Spores minute, oboval, granular or with a small oil drop, asperulate, 3–5×2–4 μ.—Ground, woods, rather common at Ithaca, N. Y. Some of the collections in the C. U. herb. are as follows No. 13550, Beebe Lake woods, Whetzel, Aug. 13, 1902; No. 15216, Buttermilk Gorge, July 15, 1903, Kauffman; No. 13284, Coy Glen, C. O. Smith, Aug. 4, 1902. Ithaca, N. Y."

My notes on *C. asperulans* apply also to this species. In *C. asperula* the fructifications are a little larger and fewer spores are even than in *C. asperulans* but of the same form, dimensions, and rough wall. The gathering of *C. asperulans* is probably a little less mature than those of *C. asperula.*

I have collected this species in Vermont. It has been distributed from New Hampshire in Reliquiae Farlowianae, 305, under the name *Clavaria corniculata.*

45. C. asperulans Atkinson, Ann. Myc. 6: 55. 1908; Sacc. Syll. Fung. 21: 430. 1912. Plate 6, fig. 45.

Type: in Cornell Univ. Herb.

"Plants 1–4 cm. high, entirely white, in drying often stained flesh-colored, with white mycelium over the base and base of primary branches as in *C. muscoides,* smooth above, repeatedly and dichotomously branched, angles arcuate, branches slightly diverging, terminal branchlets short, acute. Spores white, subglobose, with a prominent short stalk where attached to sterigma, minutely and distantly roughened, with an oil drop, 3–4 μ in diameter.—C. U. herb., No. 22131, ground under pines in mixed woods, Six Mile Creek, Ithaca, N. Y. Sept. 25, 1907, Coil & Humphrey."

Now with trunk pinkish buff and the branches slightly darker —about cinnamon buff; the mycelial coat above mentioned is a cortex like that of many species of *Tremellodendron* but the basidia are cylindric and afforded no evidence of longitudinal septation; many spores even, but some minutely and distinctly rough as stated, about 3–3½ μ.

Lachnocladium vestipes,=Clavaria vestipes Peck, should be considered in connection with *C. asperula* and *C. asperulans.*

46. C. nodulosperma Atkinson, Ann. Myc. 7: 368. 1908; Sacc. Syll. Fung. 21: 428. 1912. Plate 6, fig. 46.

Type: in Cornell Univ. Herb.

"Plant stalked, very much branched, 3–4 cm. high, branching 2–3 cm. broad. Stems slender about 3mm. in diameter. Primary branching dichotomous or subpalmate. The branches branching in a similar way, more or less flexuous and often slightly flattened. Axils acute or rounded. Plants entirely white, flour white, soft, flexible not brittle. Spores white, angular to tuberculate like the spores of some species of *Inocybe,* 5–7×3–3,5 μ.—C. U. herb., No. 22641, on ground, mixed woods by Fern Walk near Sparrow's Pond, Chapel Hill, N. C., W. C. Coker, Oct. 2, 08."

Fructifications now between cream-buff and pinkish buff; many branches are flattened, but not all, and have curved together in drying; spores hyaline, with nodular surface, 5–6× 3–4 μ.

47. C. pyxidata Persoon, Roemer Neues Mag. Bot. 1: 117. 1794; Comment. Clav. 47. *pl. 1. f. 1.* 1797; Syn. Fung. 589. 1801;

Myc: Eur. 1: 165. 1822; Fries, Syst. Myc. 1: 470. 1821; Hym. Eur. 669. 1874; Peck, N. Y. State Mus. Rept. 33: 22. 1880; Sacc. Syll. Fung. 6: 698. 1888. Plate 6, fig. 47.

Illustrations: Persoon, *loc. cit.*; Fl. Dan. *pl. 1304, f. 1.*

Fructifications forming tufts up to 3–10 cm. high, pallid, then tan color and somewhat rufescent; trunk slender, glabrous, branched, the branches and branchlets solid, all cup-shaped at the apex and with the little cups radiate-branched at the margin in a proliferous manner, the terminal ones dentate; spores white in the mass, even, 3–3½×2–2½ μ.

On rotten wood. New Hampshire to Missouri. July to October. Rather common on rotten *Salix* near St. Louis.

Although Cotton and Wakefield, *loc, cit.*, p. 198, regard *C. pyxidata* as an indeterminable species, "possibly an abnormal form of *C. stricta*," nevertheless it is sharply characterized among the European species, the pyxidate cups suggesting those of a lichen (*Cladonia*) as emphasized by Persoon in the original description but not faithfully shown by the artist in Persoon's accompanying illustration. Good European specimens have been distributed in Krieger, Fungi Sax., 1156 and 1156b, with which our American collections agree well. An American gathering from New Hampshire has been distributed in Reliquiae Farlowianae, 309.

48. C. Petersii Berk. & Curtis, Ravenel, Fungi Car. 5: 33. 1860; Grevillea 2: 7. 1873; Sacc. Syll. Fung. 6: 716. 1888. Plate 6, fig. 48.

Type: in Ravenel, Fungi Car. 5: 33.

"E communi basi ramosa; ramis strictis subfastigiatis apice apiculato divisis rufis. No. 4576 bis. Alabama, Peters. On dead wood.

"About 2 inches high, branched from the very base; branches straight, somewhat fastigiate, rufous, tips apiculate."

The fructifications are now pinkish cinnamon, and branches probably hollow, but this is difficult to determine positively from dried pressed specimens. The branches and branchlets are not cup-shaped at the apex. Long, slender, hyaline, conducting organs are present in crushed preparations; spores hyaline, even, flattened on one side, 4×2–2½ μ.

49. C. coronata Schweinitz, Am. Phil. Soc. Trans. N. S. 4: 182. 1832; Sacc. Syll. Fung. 6: 712. 1888; Morgan, Cincinnati

Soc. Nat. Hist. Jour. 11: 88. *pl. 2. f. 1.* 1888. Plate 7, fig. 49.

Illustrations: Morgan, *loc. cit.*

Type: in Herb. Schweinitz—no duplicate in Curtis Herb.

"In ligno putrido dejecto Bethlehem.

"C. lignatilis, jam e basi divisa, ramosissima; ramis primordialibus divergentibus demum complanatim aut angulatim compressis, apicibus adhuc divergentioribus truncato-obtusis, in ipsa truncatura coronatis processubus minutis circumcirca Cladoniae more. Substantia subtenaci. Ramis omnibus madido statu quasi subdiaphanis et subviscosis, substriatis; exsiccata autem non cornea fit. Mediocri magnitudine. Colore pallido-cervino."

Fructification of medium size, divided immediately from the base and very much branched; the primary branches divergent, then compressed in a plane or angularly; the final branchlets truncate at the apex and there encircled with a crown of minute processes in the manner of a *Cladonia;* all branches somewhat striate, somewhat diaphanous and somewhat viscous when moist but not horn-like when dry; substance somewhat tough. The original specimen is now between light pinkish cinnamon and pinkish cinnamon, somewhat longitudinally wrinkled; the few spores present are hyaline, even, 3–6×2–3 μ, usually 4×2½–3 μ.

Careful examination failed to show cup-shaped apices of the branches, by the absence of which this species is distinguishable from *C. pyxidata.* Morgan reported this species common on rotten wood in Ohio, repeatedly dichotomously or verticillately branched and forming clusters sometimes several inches in height and extent; his figure agrees closely with my photograph of the type and shows the details better.

50. C. pinophila Peck, N. Y. State Mus. Rept. **35**: 136. 1884; Sacc. Syll. Fung. **6**: 699. 1888. Plate 7, fig. 50.

Type: in N. Y. State Mus. Herb.

"Stems short, more or less tufted, much branched; branches crowded, often compressed above and subdigitately divided, pale-ochraceous, ultimate ramuli rather long, subulate, white; spores oblong or sublanceolate, .0004′ - .0005′ long, .00016′ broad.

"Thin woods under pine trees. East Berne. August.

"The tufts are about one inch high. The spores appear white when caught on brown paper."

The fructifications now have the hymenial portion between

avellaneous and drab and the stem paler—somewhat olive-gray; spores hyaline, even, flexuous, 13½–15×3½–4 μ.

51. C. asterella Atkinson, Ann. Myc. **6**: 55. 1908; Sacc. Syll. Fung. **21**: 431. 1912. Plate 7, fig. 52.

Type: in Cornell Univ. Herb.

"Plants ochraceous, 5–7 cm. high. Trunk short, primary branches open, bases divaricate, axils rounded, upper branches fastigiate. Plants soft, flexible. Spores small, white, oboval, inequilateral in side view, with an oil drop, 4–5×2,5–3 μ, with a few scattered short spines.—C. U. herb., No. 11914, on leaf mold, lower slope Mt. Mitchell, Black Mts. Yancey Co., N. C. G. F. Atkinson, Sept. 1901."

Fructification now pinkish buff; spores hyaline, showing a few slender spines under the immersion objective.

52. C. divaricata Peck, N. Y. State Mus. Bul. **2**: 11. 1887; N. Y. State Mus. Rept. **54**: 171. 1901; Sacc. Syll. Fung. **9**: 249. 1891. Plate 7, fig. 53.

Type: in N. Y. State Mus. Herb.

"Stem short, small, whitish, much branched; branches widely spreading, terete, even or slightly longitudinally wrinkled, more or less curved, pale-ochraceous, the ultimate ones tapering outward and terminating in one or more acute points; spores .0004 to .0005 in. long, .0002 to .00025 broad.

"Tufts 2 to 4 in. high, and nearly as broad.

"Woods. Sandlake. August.

"This is a rare species, and is remarkable for and easily distinguished by its divaricate branches which give to the plant a very spreading, straggling aspect."

The fructifications grew on the ground and are now light ochraceous buff in all parts; branches spongy within, somewhat flattened in drying; spores hyaline, distinctly rough, 11–13× 4½ μ. I noted the spores as rugulose when preparation was first made in aqueous mount and studied with dry objective, but upon reexamination of the preparation, now in glycerine mount, the spores appear distinctly rough, not rugulose, under immersion objective.

53. C. lentofragilis Atkinson, Ann. Myc. **6**: 57. 1908; Sacc. Syll. Fung. **21**: 425. 1912. Plate 7, fig. 54.

Type: in Cornell Univ. Herb.

"Plants 15 cm. high, tufts 12 cm. broad; trunks 2–4 cm. long by 2–3 cm. thick, dividing into several short branches which are repeatedly dichotomously branched, axils slightly rounded; tips short, conic. Trunk gray, branches white, tips soft and fragile. Spores white, oboval to subglobose, asperulate, 4–6 μ in diameter. Taste and odor not marked.—C. U. herb., No. 20242, on very rotten wood in sphagnum swamp, Smithton, L. Isl., N. Y."

The branched portion of the fructification is now somewhat warm sepia and the main trunk and main branches are paler, more ochraceous; spores hyaline, minutely aculeate, subglobose, 6×5 μ.

This is a species very distinct from others known to me and distinguished by its occurrence on wood, large size, and hyaline, subglobose, aculeate spores.

54. C. corniculata Schaeffer, Icones Fung. *pl. 173.* 1763; Persoon, Syn. Fung. 589. 1801; Myc. Eur. 1: 170. 1822; Fries, Syst. Myc. 1: 471. 1821; Cotton & Wakefield, Brit. Myc. Soc. Trans. 6: 181. 1919. Plate 7, fig. 55.

C. muscoides Linn. Spec. Plant. 1183. 1753; Fries, Epicr. 571. 1838; Hym. Eur. 667. 1874; Berkeley, Outl. Brit. Fung. 279. 1860; Peck, N. Y. State Mus. Rept. 47: 151. 1894.

Illustrations: Schaeffer, *loc. cit.;* Holmskiold, Fungi Dan. *pl. 21;* Patouillard, Tab. Anal. Fung. *f. 564;* Fl. Dan. *pl. 775. f. 3.*

Fructification two or three times branched, 2–4 cm. high, apricot-yellow, a little tough, the stem slender; odor and taste not noteworthy; basidia with 4 sterigmata; spores white in spore collection, even, globose, 5–6 μ in diameter.

On ground in woods. August to October. Probably frequent. Known to me from Vermont to Michigan and Missouri.

C. corniculata may be recognized by its slender stem and branches, apricot-yellow color, and white, even, globose spores. In England it is reported as occurring among grass, especially in fields, but I have found it only in moist, mixed woods.

55. C. Peckii Sacc. Syll. Fung. 9: 249. 1901. Plate 7, fig. 56.

Clavaria similis Peck, N. Y. State Mus. Rept. 43: 24. 1890, but not of Boud. & Pat. Jour. de Bot. 2: 341, 446. *pl. 8. f. 1.* 1888.

Type: in N. Y. State Mus. Herb.

"Caespitose, subtenacious, slender, three to four times di-

chotomously branched, pallid, the ultimate ramuli short, obtuse, the axils rounded; spores subglobose, .00025 in. in diameter, mycelium white.

"Plant 1 to 2 in. high. Woods. Plattsburgh. August.

"This scarcely differs from *Clavaria muscoides*, except in its paler color and in the obtuse tips of the ultimate ramuli."

Fructifications now avellaneous; spores copious, hyaline, even, 7–9×6–7 μ, mostly 7×6 μ.

This should be compared with *C. fastigiata* Holmsk., which Cotton and Wakefield regard as a variety of *C. corniculata*.

56. C. muscoides L. var. **obtusa** Peck, N. Y. State Mus. Rept. **47**: 151. 1894. Plate 7, fig. 57.

Type: in N. Y. State Mus. Herb.

"Tips of the ultimate branches obtuse. Otherwise like the type.

"Under cedar trees. Canada. September. Macoun."

Fructification now Sayal-brown; spores hyaline, even, subglobose, 5–6×4½–5 μ.

57. C. fellea Peck, N. Y. State Mus. Rept. **51**: 292. 1898; Sacc. Syll. Fung. **16**: 205. 1902. Plate 7, fig. 58.

Type: in N. Y. State Mus. Herb.

"Clubs about 1 inch high, ochraceous yellow, sparsely and subdichotomously branched; stem terete, solid; branches crowded, nearly parallel, the tips obtuse, concolorous; spores globose, .00024 in. broad; mycelium white.

"Under oak trees, Gansevoort. July. Related to *C. muscoides*. The flavor is bitter and slightly farinaceous."

Fructification now between chamois-color and pinkish buff, the stem paler and with a fibrous surface like blotting paper; basidia with 4 sterigmata; spores hyaline, even, globose, 5–6 μ in diameter.

58. C. Herveyi Peck, N. Y. State Mus. Rept. **45**: 24. 1893. Bot. ed.; Sacc. Syll. Fung. **11**: 135. 1895 Plate 7, fig. 59.

Type: in N. Y. State Mus. Herb.

"Gregarious or subcaespitose, simple or with a few branches, often compressed or irregular, scarcely one inch high, golden-yellow, sometimes brownish at the apex, flesh white, branches when present short, simple or terminating in few or many more or less acute denticles; spores globose, .0003 in. broad, minutely roughened; mycelium white.

"Ground under hemlock trees. Orono, Maine. September. F. L. Hervey.

"Allied to *C. fastigiata* and *C. muscoides* but distinct from both by its more irregular and less branching character and by its larger spores."

The type is now cinnamon-colored, irregular in form, few-branched, compressed, very suggestive of *C. rugosa* in aspect; spores hyaline, even, subglobose, 8–9 μ in diameter.

It is possible that the description was based on specimens of *C. rugosa* unaccompanied by field notes, received in dried condition, and already having the golden color assumed by this species in drying.

59. C. cinerea Bulliard, Herb. de la France, *pl. 354.* 1787; Persoon, Syn. Fung. 586. 1801; Fries, Syst. Myc. **1**: 468. 1821; Hym. Eur. 668. 1874; Sacc. Syll. Fung. **6**: 695. 1888: Peck, N. Y. State Mus. Rept. **24**: 81. 1872; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 178. 1919. Plate 8, fig. 60.

Illustrations: Bulliard, *loc. cit.* (unusual form); Dufour, Atlas Champ. *pl. 68. f. 149;* Greville, Scot. Crypt. Fl. *pl. 64;* Patouillard, Tab. Anal. Fung. *f. 154;* Stevenson, Brit. Hym. **2**: 290. *text f. 91.*

Fructifications branched, very variable in habit, usually 3–5 cm. in height but sometimes more, solitary or gregarious, grayish or with faint tinge of purple, rather brittle; smell none, taste mild, flesh white; stem more or less distinct, thick, short; branching irregular, repeated, uneven, axils usually acute; branches thick or slender, cylindric or compressed, short, stuffed, erect, wrinkled, apices often toothed; basidia with 2 sterigmata; spores copious, hyaline, even, 7–10×6–8 μ.

On ground in woods. Edible.

C. cinerea has been reported so rarely in the United States that the above description from Cotton and Wakefield—more complete than heretofore available for this species—together with the copy of the original illustration should afford needed aid for critical study of specimens which seem referable here. See also *C. cristata.*

60. C. cinereoides Atkinson, Ann. Myc. **7**: 367. 1909; Sacc. Syll. Fung. **21**: 431. 1912. Plate 8, fig. 61.

Type: in Cornell Univ. Herb.

"Plants very much branched from base, 7 cm. high, 5–6 cm. broad, trunk absent. Plants uniformly gray when fresh. Base of branches whitish in drying, upper portion of plant becoming pale ochre or buff. Branches dichotomous, slightly clavate, numerous. Axils acute or rounded. Tips usually bidentate, teeth rounded. Plant somewhat tough. Basidia slender, 4-spored, 40–45×7 μ. Spores globose, smooth, white, pedicellate, with large oil drop, 4–6 μ. The plant resembles *Clavaria cinerea* in color when fresh but the spores are much smaller, the branches more slender. In size and shape the spores resemble those of *Clavaria fusiformis* but the plant is very different from that species.—C. U. herb., No. 22640, on ground, among pine needles, mixed woods, hill side by Fern Walk, Chapel Hill, N. C. W. C. Coker."

Stems and branches of nearly uniform diameter, the branches now usually cinnamon-buff, the stems paler and approaching olive-buff and bearing small squamules of matted fibrils; bidentation of tips of branches not prominent; spores hyaline, even, globose, 5–6 μ in diameter.

The dried specimen impressed me as tough rather than fleshy where moistened; if not fleshy when fresh, this species should be transferred to *Lachnocladium*, a transfer favored also by the squamulose stem.

61. C. amethystina (Battara) Bulliard, Herb. de la France, *pl. 496. f. 2.* 1790; Persoon, Comment. Clav. 46. 1797; Fries, Obs. Myc. **2**: 286. 1918 and 1924; Hym. Eur. 667. 1874; Berkeley, Outl. Brit. Fung. 279. *pl. 18. f. 2.* 1860; Sacc. Syll. Fung. **6**: 693. 1888; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 180. 1919. Plate 8, fig. 62.

Coralloides amethystina Battara, Fung. Agr. Arim. 22. *pl. 1. f. C.* 1755—*Ramaria amethystina* Holmskiold, Fungi Dan. 110. *pl. 28.* 1799.

Illustrations: Battarra, *loc. cit.;* Bulliard, *loc. cit.;* Holmskiold, *loc. cit.;* Berkeley, *loc. cit.*

Fructifications branched, 3–4 cm. high, forming small, very compact tufts, lilac or mauve, turning rapidly to yellowish on drying, rather brittle; smell strong, taste tallowy, flesh uniform; stem very short, scarcely distinct; branching irregular, axils not flattened; branches thick, 3–5 mm. in diameter, short, cylindric, not attenuated, erect, smooth, solid, apices blunt; basidia with

2–4 sterigmata; spores hyaline, even, globose, 5–7 μ in diameter.

Among grass in woods and pastures.

Cotton and Wakefield add further: "*C. amethystina* has somewhat the habit of a short thick form of *C. cinerea*, with the deep colored forms of which it has by some authors been confused. When once the true plant has been seen, however, there is no difficulty in distinguishing it by its beautiful violet color (almost as deep as that of *Laccaria laccata* var. *amethystina*), and by its smaller spores."

Peck has collected this species in New York; I have referred a Vermont gathering here.

62. C. amethystinoides Peck, Torr. Bot. Club Bul. **34**: 102. 1907; Sacc. Syll. Fung. **21**: 429. 1912. Plate 8, fig. 63.

Type: in N. Y. State Mus. Herb.

"Clubs 2–4 cm. tall, with few rather short suberect branches, very pale-lilac, becoming drab-gray in drying, the branches often compressed and rugose, more or less pruinose when dry, the tips commonly acute; spores globose, 8 μ in diameter.

"Among sphagnum. Stow, Massachusetts. September. S. Davis.

"This species is evidently related to *C. amethystina* Bull. and *C. Schäfferi* Sacc. From the former it is separated by its different mode of branching and its globose spores; from the latter, to which it seems more closely allied, by its simple, not cespitose mode of growth, by the acute or mucronate tips of the branches, and by the pruinose character of the branches, which also are often rugose and irregular."

Fructifications now with trunk and main branches tawny olive and the terminal branches discolored somewhat olive-brown and pruinose; main stem somewhat compressed and twisted in drying, the terminal branches more cylindric, rather stout, irregular, usually obtuse; spores hyaline, even, subglobose, 6–7×5–6 μ, copious.

63. C. exigua Peck, N. Y. State Mus. Rept. **54**: 155. 1901. Plate 8, fig. 64.

Type: in N. Y. State Mus. Herb.

"Very small; stem slender, dichotomously or somewhat irregularly branching, white, branches delicate lavender color or the lower white toward the base, tips subacute, axils rounded; spores minute, globose, .00008–.0001 of an inch broad.

"Among fallen leaves in woods. Floodwood. September. The whole plant is scarcely more than six lines high. The coloring of the upper part is very delicate and beautiful."

Fructifications now with all parts pinkish buff; spores hyaline, even, 3×2 μ.

64. C. aurantio-cinnabarina Schweinitz, Am. Phil. Soc. Trans. N. S. 4: 183. 1832; Sacc. Syll. Fung. 6: 718. 1888.

Plate 8, fig. 65.

Type: authentic specimen from Herb. Schw. in Curtis Herb., no specimen now in Herb. Schw.

"Locis terrae nudae ad ripas Lehigh in Rhododendretis.

"C. terrestris ad radices tamen arborum, simplex, carnosa, subtenax, fasciculatim proveniens, seriebus saepe elongatis, multiformis, varians a junioribus 3 linearibus ad triunciales adultas altitudine. Deorsum attenuata, medio incrassata, apicem versus iterum attenuata. Clavulis aetate compressis, flexuosis, juventute teretibus. Basi albo-pulverulenta aut pruinata et subbyssacea. Ceterum gaudet colore ex aurantio in cinnabarinum vergenti. Majoribus clavulis interdum ¼ uncialibus crassitie; apice semper obtusiusculo."

Fructifications simple, cespitose, fleshy, somewhat tough, 6 mm. when young to 7 cm. high when full grown, 6 mm. thick, thickened in the middle, attenuated towards both base and apex, cylindric when young, becoming compressed and flexuous, from golden yellow verging into cinnabar; the base white-pulverulent or pruinose and somewhat byssoid; apices always obtuse.

The original specimen is now between cinnamon-drab and Rood's brown, with clubs hollow where shown broken across, somewhat compressed; basidia with 4 stout sterigmata, each 9–13 μ long; spores even, globose, 5–6 μ in diameter, hyaline.

I have gatherings from Vermont and New York which seem referable to this species but usually lack notes as to whether bitter or not, for I was not aware until the appearance of Cotton and Wakefield's recent work that the closely related *C. fusiformis* has a bitter taste; however, in one Vermont collection I did note the taste as pleasant, and in another as with the fragrant odor of *Cantharellus cibarius*. What Hard[1] illustrates and discusses as *C. fusiformis* may have been *C. aurantio-cinnabarina*, for he states that the specimens have an excellent flavor.

[1]Hard, Mushrooms, 472, *text f. 397.* 1908.

65. C. fusiformis Sowerby, British Fungi, *pl. 234, 235.* 1797; Fries, Syst. Myc. **1**: 480. 1821; Hym. Eur. 674. 1874; Persoon, Syn. Fung. 601. 1801; Myc. Eur. **1**: 178. 1822; Sacc. Syll. Fung. **6**: 718. 1888; Peck, N. Y. State Mus. Rept. **23**: 53. 1872; Morgan, Cincinnati Soc. Nat. Hist. Jour. **11**: 89. 1888; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 184. 1919. Plate 8, fig. 66.

Illustrations: Sowerby, *loc. cit.;* Bolton, Hist. Fung. *pl. 110;* Hussey, Ill. Brit. Myc. **1**. *pl. 18;* Patouillard, Tab. Anal. Fung. *f. 565;* Cotton, Brit. Myc. Soc. Trans. **3**. *pl. 11. f. A.*

Fructifications simple or very rarely branched, densely tufted, connate at the base, 5–8 cm. high, clear canary-yellow; smell none when fresh, taste bitter; flesh whitish; clubs elongated, spindle-shaped, tips acute, often becoming hollow and compressed; internal structure of fine filaments 4–6 μ thick, more or less interwoven, walls sometimes rough; occasional hyphae with dark yellow contents; basidia with 4 sterigmata which are slightly curved; spores globose, even, minutely apiculate, 5–7 (–8) μ in diameter, at first yellow, then colorless.

On ground in woods. August.

Cotton and Wakefield add further: "Known amongst the simple yellow species by the densely tufted habit, the canary-yellow color and the bitter taste."

C. fusiformis has been regarded as common in all parts of the United States but it seems probable that with the heretofore incomplete knowledge of the species, gatherings more properly referable to *C. aurantio-cinnabarina, C. compressa,* and *C. platyclada* have been lumped together here.

66. C. compressa Schweinitz, Am. Phil. Soc. Trans. N. S. **4**: 182. 1832; Sacc. Syll. Fung. **6**: 709. 1888. Plate 8, fig. 67.

Type: in Herb. Schweinitz, a fragment in Curtis Herb.

"Distinctissima species, Dr. Kampman ex New Jersey communicavit.

"C. majuscula, 2–3 uncias longa, ex ipsa basi crassiuscula vage ramosa, ramis crassis non valde divisis, complanato compressis, quasi canaliculatis, apice obtusatis, deorsum attenuatis. Flavo-alutacea."

Clubs simple, densely tufted, more or less grown together at the middle where in contact, hardly branched, 5–8 cm. high, compressed in a common plane, yellow alutaceous, attenuated below, apices obtuse; smell, taste, and the color of flesh not re-

corded; spores hyaline, even, globose, apiculate, 5–6 μ in diameter, copious.

The specimen in Herb. Schweinitz is now honey-yellow, with 2 or 3 clubs discolored Isabella-color; examination and manipulation when moistened of two clubs at place of fracture where the ends are gone, shows no tendency to become cylindric and favors the view that the inner surfaces of contact of the wall were grown together when fresh by a medullary portion and were not hollow. This species may prove separable from *C. fusiformis* by absence of hollow clubs and bitter taste.

67. C. platyclada Peck, Torr. Bot. Club Bul. **23**: 419. 1896; N. Y. State Mus. Rept. **50**: 114. 1897; Sacc. Syll. Fung. **14**: 237. 1899. Plate 8, fig. 68.

Type: in N. Y. State Mus. Herb.

"Clubs caespitose, more or less connate at the base, simple or forked, rarely with one or two irregular branches, solid, compressed, tapering below into a whitish base, canary yellow, white within, the tips flattened, obtuse, becoming brownish with age; spores globose, .0002 to .00024 in. broad. Tufts 3 to 4 in. high; clubs 2 to 4 lines wide, scarcely more than 1 line thick.

"Woods. Maine. September. Harriet C. Davis.

"The species is closely allied to *Clavaria fusiformis*, from which it is separated by its solid, obtuse, compressed and often forked or branched clubs tapering below into a whitish base."

Clubs now yellow ocher, compressed, solid; spores hyaline, even, globose, 5–6 μ in diameter, minutely apiculate. Since the odor and taste of the clubs when fresh were not recorded, notes on these points should be made for New England collections which seem referable here. *C. platyclada* does not seem distinct from *C. compressa*.

68. C. Macouni Peck, N. Y. State Mus. Rept. **47**: 150. 1894; Sacc. Syll. Fung. **11**: 137. 1895. Plate 8, fig. 69.

Type: in N. Y. State Mus. Herb.

"Clubs single or clustered, 6 to 10 lines high, obtuse or subacute, dingy greenish-yellow or pale cinereous; spores minute, elliptical, .0002 in. long, .00012 broad.

"Among mosses under cedar trees. Canada. September. Macoun.

"The species belongs to the section Syncoryne."

The single club preserved as the type is now avellaneous; basidia simple, with 4 sterigmata; spores hyaline, rough, thin-walled, flattened on one side, 4½×3 μ.

69. C. pilosa Burt, n. sp. Plate 8, fig. 70.

Type: in Mo. Bot. Gard. Herb.

Fructifications simple, growing singly or 2–3 in a cluster, when dry 1–2 cm. long, 2 mm. thick, buffy brown to drab, compressed, thickened in the middle, apices obtuse; cylindric, hair-like, hyaline cystidia not incrusted, 6 μ in diameter, protrude in the hymenium up to 30 μ beyond the basidia; spores hyaline under the microscope, even, subglobose, 6–8×6–7 μ.

On humus. Martin Pino, Porto Rico. Feb. 22, 1914. Colls., *J. R. Johnston & J. A. Stevenson, 1453,* type (in Mo. Bot. Gard. Herb., 14540).

The specimen was not accompanied by notes of the characters when fresh. When moistened it seems to me too fleshy for the genus *Lachnocladium.* The species is noteworthy by the presence of hair-like cystidia in the hymenium.

70. C. pallescens Peck, N. Y. State Mus. Bul. **131**: 34. 1909; **139**: 47. 1910; Sacc. Syll. Fung. **21**: 434. 1912.

Plate 8, fig. 71.

Type: in N. Y. State Mus. Herb.

"Clubs simple, loosely cespitose or gregarious, 2.5–4 cm. tall, clavate, soft, fragile, obtuse, pale buff fading to whitish, sometimes minutely rugulose, stuffed or hollow, pale yellow within; stem short, glabrous, 2–4 mm. long, pale yellow; spores oblong or elliptic, white, 9–12×6–8 μ.

"Dry gravelly soil near *Kalmia angustifolia* L. South Acton, Mass. October. S. Davis and G. E. Morris.

"This species is allied to *Clavaria ligula* Fr. from which it differs in its smaller size, in its color becoming whitish or paler with age or in drying, but being lemon-yellow and more persistent within, in its glabrous lemon-yellow stem and in its broader spores. It is apparently a rare but very distinct species."

Fructifications are now chamois-colored, flattened, rugose, stuffed or hollow, and consist of a tuft of 14 clubs arising from a whitish mycelium on the ground; spores hyaline, even, 10–10½ ×4½ μ, copious—none more than 4½ μ thick.

I found several tufts of this species growing among

Polytrichum moss on a dry knoll at Middlebury, Vt.; these clubs were avellaneous when fresh. *C. pallescens* is closely related to *C. fumosa* but its clubs are as closely crowded together at the base as are those of *C. fusiformis* and do not become gray in color. The illustration by Krombholz of *C. fumosa* shows the clubs merely near together at the base but not actually touching one another there, whereas Cotton and Wakefield state that the species has the dense tufted habit of *C. vermicularis*.

71. C. nebulosa Peck, Torr. Bot. Club Bul. **25**: 326. 1898; Sacc. Syll. Fung. **16**: 207. 1902. Plate 8, fig. 72.

Type: in N. Y. State Mus. Herb.; specimen from type collection, *Waghorne, 227,* is in Mo. Bot. Gard. Herb. and has been compared with type.

"Clubs simple, closely gregarious, 2.5–12 cm. high, fragile, hollow, narrowed toward each end, isabelline or clay color, sometimes clouded with darker hues, apt to become blackish in drying; spores oblong or narrowly elliptical, 6–7.5 μ long, 3.5–4 μ broad.

"Sandy soil, Sandy Point, Newfoundland. September. Waghorne."

Has the aspect of a diminutive *C. fistulosa* but with the clubs densely tufted; spores hyaline, even, 6–7×3–3½ μ. Should be compared with *C. fumosa*.

72. C. lavendula Peck, N. Y. State Mus. Bul. **139**: 47. 1910; Sacc. Syll. Fung. **21**: 431. 1912. Plate 9, fig. 73.

Type: in N. Y. State Mus. Herb.

"Tufts 2.5–4 cm. high, densely and subdichotomously branched, the branches compressed, thin, lilac pink when moist, pruinose when dry, the ultimate ones often bidentate, axils rounded; spores minute, 6–8×3–4 μ.

"Chestnut grove. Stow, Mass. July. S. Davis.

"This species is related to *Clavaria amethystina* Bull., but it differs in its flattened branches and smaller spores."

The color of the type has faded to between pinkish buff and light buff; spores hyaline, even, 6×3 μ.

A fine collection of this species from the type locality, communicated by Miss Ann Hibbard and accompanied by water color drawing, notes, and spore collection, shows the spores white in the mass; the clubs are densely tufted, attenuated

downward, sometimes simple clubs with apex obtuse, sometimes with tips bidentate or bilobed, and sometimes divided above into short, obtuse branchlets. Since the fructifications lack a common trunk and are tufted I have located this species in the *Syncoryne*. The specimens bear some resemblance to the original figure of *C. amethystina, pl. 7, fig. 62,* but a closer resemblance in aspect to *C. Schaefferi* Sacc., as given in Schaeffer, Icones Fung., *pl. 172,* and should be compared with European specimens of this species, as suggested by Miss Hibbard.

73. C. vermicularis (Scop.) Fries, Syst. Myc. 1: 484. 1821; Hym. Eur. 675. 1874; Stevenson, Brit. Hym. 2: 298. *text f. 92.* 1886; Sacc. Syll. Fung. 6: 720. 1888; Morgan, Cincinnati Soc. Nat. Hist. Jour. 11: 89. 1888; Cotton & Wakefield, Brit. Myc. Soc. Trans. 6: 183. 1919. Plate 9, fig. 74.

Clavaria vermiculata Scopoli, Fungi Carn. 2: 483. 1772; Berkeley, Brit. Fung. 282. 1860.— *C. fragilis* Holmskiold, p. p., Fungi Dan. 1: 7. *pl. 2.* 1799; Fries, Syst. Myc. 1: 484. 1821; Hym. Eur. 675. 1860; Peck, N. Y. State Mus. Rept. 24: 82. 1872; Sacc. Syll. Fung. 6: 721. 1888; Morgan, Cincinnati Soc. Nat. Hist. Jour. 11: 89. 1888.

Illustrations: Holmskiold, *loc. cit.;* Cooke, Brit. Ed. Fungi, *pl. 4. f. 15;* Stevenson, *loc. cit.;* Hard, Mushrooms, *text f. 395;* Patouillard, Tab. Anal. Fung. *f. 468.*

Fructifications unbranched, densely tufted, somewhat flexuous, brittle, white, about 4–6 cm. high, with the clubs cylindric, sometimes twisted and compressed, even, fragile, becoming hollow, the apex acute; stem not distinct; basidia 30×6–7 μ, with 4 sterigmata; spores white in the mass, even, subglobose, 3–5× 3–4 μ.

On ground. On moist wooded hillsides, grassy borders of woods and in meadows. June to October. Probably common.

Cotton and Wakefield add further: "Easily distinguished among the white species by the densely tufted habit, very fragile clubs, and small spores."

I have studied American gatherings from Vermont, Pennsylvania, Ohio, and Missouri which agree well with the above description. These specimens were not yet in the stage with stem hollow. *C. fragilis* which has been reduced to synonymy by Cotton and Wakefield as the final stage of *C. vermicularis* was originally regarded as distinct by the hollow stem.

74. C. tenuis Schweinitz, Am. Phil. Soc. Trans. N. S. **4**: 182. 1832; Sacc. Syll. Fung. **6**: 730. 1888. Plate 9, fig. 75.

Type: in Herb. Schweinitz—no specimen in Curtis Herb.

"C. sparsim ex ligno proveniens, fere simplex, affinis *C. mucidae,* et tantum rarius apice furcato. Ceterum tenuis, ¼ unciali longitudine, pallida aut alba, gracilis.

"In muscis nobis ex New York missis."

Clubs simple, solitary, only rarely forked at the apex, white or pallid, slender, tenuous, 6 mm. high.

Three clubs are now to be found; these grow directly from the moss—not from wood. One of these clubs has been brought out for the photographic illustration by slipping about the fructification a small square of white paper so as to cover the moss and have the fructification project natural size against the white background. Each fructification in its present dried condition is 2 mm. long and pale pinkish buff; hyphae 3–3½ μ in diameter, even, long-celled, not nodose-septate; spores hyaline, even, subglobose, 3–3½×3 μ, none seen attached to basidia; basidia not made out.

This species is very distinct from the figure of *Typhula muscicola* in Persoon, Obs. Myc. **2**. *pl. 3. f. 2,* a species much larger and often with a tubercule at the base. *Eocronartium,* parasitic on mosses about Ithaca, New York, should be kept in mind in connection with *C. tenuis. Eocronartium* has transversely septate basidia.

75. C. misella Berk. & Curtis, Linn. Soc. Bot. Jour. **10**: 339. 1868; Sacc. Syll. Fung. **6**: 731. 1888. Plate 9, fig. 76.

Type: in Curtis Herb. and probably in Kew Herb.

"Alba, simplex, clavata, obtusa; stipite tenui, basi spongiosa dilatata.

"Attached to Mosses. Not exceeding ½ inch in length; opake when dry. Nearly allied to *C. paupercula,* B. & C., a species from Venezuela, which also grows on moss, but is pellucid and rugose when dry." [Cuba. C. Wright, 222].

Of the several fructifications on the moss plant two were made more conspicuous for the photograph by slipping over the moss small rectangles of white paper so as to afford a white background for the clubs. The clubs are now between cartridge-buff and pinkish buff, with the stem attached in each case to a cluster of 2 or 3 moss leaves, tapering upward slightly to the hymenial

portion, and with the latter somewhat swollen; hyphae hyaline, even, coarse, 4½ μ in diameter; basidia simple, 4-spored; spores hyaline, even, 5–7×3–3½ μ.

76. C. mucida Persoon, Comment. Clav. 55. *pl. 2. f. 3.* 1797; Syn. Fung. 595. 1801; Fries, Syst. Myc. 1: 476. 1821; Hym. Eur. 679. 1874; Sacc. Syll. Fung. 6: 729; Karsten, Finska Vet. Soc. Bidrag Natur och Folk 48: 379. 1889; Peck, N. Y. State Mus. Rept. 24: 82. 1872; Morgan, Cincinnati Soc. Nat. Hist. Jour. 11: 90. 1889; Atkinson, Mushrooms, 203. *text f. 204.* 1901; Coker, Bot. Gaz. 37: 63. *text f. 16–17.* 1904; Hard, Mushrooms, 473. *text f. 398.* 1908. Plate 9, fig. 77.

Illustrations: Persoon, *loc. cit.;* Fl. Dan. *pl. 1376;* Atkinson, *loc. cit.;* Coker, *loc. cit.;* Hard, *loc. cit.*

Clubs gregarious, 6–8 mm. long, small, simple or sparingly ramose-incised, even, naked, white, the apex somewhat yellowish, glabrous; spores hyaline, even, 5–6×2–3 μ.

On green, algal-coated patches of very rotten wood. October and November. Widely distributed, reported common in some localities.

C. mucida is noteworthy by its association with a green, algal coating on very rotten wood. This association has been noted by all the European authors cited above and also by Peck, Morgan, and Coker. Persoon referred to the coating as a green, powdery crust and represented it so faithfully in his type illustration that it was necessary to eliminate the green by a color filter in order to bring out the clubs in the photographic illustration. Fries called the alga a *Chlorococcus,* Karsten, a *Pleurococcus,* and Peck, a confervoid growth. Coker gives a figure showing hyphae running between algal cells and suggests that *C. mucida* may be a basidiomycetous lichen. A specimen in my herbarium, collected at Ithaca, N. Y., by C. O. Smith, shows well the green coating from which the clubs arise; the spores of this specimen have the dimensions published by Karsten. For the negative of *C. mucida* and for other aid in photography I am indebted to Mr. A. F. Camp.

C. mucida var. **Curtisii** Berkeley, Grevillea 2: 17. 1873. Plate 9, fig. 78.

Type: in Curtis Herb. and probably in Kew Herb.

"Clavata brevis lutea apice fusca; stipite albo, e mycelio

parco albo orbiculari oriundo. No. 974 is one forked and narrow. "On wet-rotting stumps."

A rectangular piece of white paper was slipped back of three fructifications to render them more visible in the photograph. The clubs are now clavate, orange-cinnamon (resin-colored), 3 mm. long; such spores as were found are hyaline, even, subglobose, 4×3½ μ—so few in number that I am not sure they belong to this fungus.

77. C. biformis Atkinson, Ann. Myc. **6**: 56. 1908; Sacc. Syll. Fung. **21**: 434. 1912. Plate 9, fig. 79.

Type: in Cornell Univ. Herb.

"Plants dull white to sordid yellow, in age tips usually darker, cylindrical, base only slightly more slender, 1–4 cm. high, 0,5–1,5 mm. stout, usually simple, or one to two times dichotomously branched. Basidia 20–25×4–5 μ, 4-spored. Spores oboval, white, smooth, granular or with an oil drop, 3–4×2,5–3 μ.—C. U. herb., No. 13432, leaf mold on ground, woods, Ithaca, N. Y., Aug. 8, 1902; No. 10699, Blowing Rock, Blue Ridge Mts., N. C. Geo. F. Atkinson, Aug. 19–Sept. 22, 1901."

The clubs are now cinnamon-brown, filiform, with a whitish, mycelioid base; spores hyaline, even, 3–4×2½–3 μ, few found.

78. C. subfalcata Atkinson, Ann. Myc. **6**: 58. 1908; Sacc. Syll. Fung. **21**: 435. 1912. Plate 9, fig. 80.

Type: in Cornell Univ. Herb., consisting of Nos. 11577, 10689, 13675, and 13613—each marked, "Part of type." Arranged for photograph in order given with No. 11577 at the left.

"Plants small, entirely white when fresh, yellowish when dry, rarely white, very slender, 1–3 cm. high, 1 mm. stout; clavula dull white; stipe distinct and transparent, with white mycelium spreading over substratum. Basidia 4-spored. Spores oval-subelliptical, thin-walled, granular, smooth, 7–10×5–7 μ, in age with a large oil drop. Near *C. affinis* but spores not punctate.—C. U. herb., No. 13299, Beebe Lake woods, C. O. Smith, Aug. 5, 1902; No. 13613, McGowan's woods, Long, Aug. 20, 1902; No. 13675, ground, Six Mile Creek, Whetzel, Aug. 22, 1902; No. 18656, on rotten wood on ground, Enfield George, Oct. 22, 1904, Jackson and Whetzel; No. 14108, Fall Creek behind Chemical building, Thom., Oct. 22, 1902 (all these specimens in vicinity of Ithaca, N. Y.); No. 10689, clay bank, Blowing Rock, Blue Ridge

Mts., N. C., G. F. Atkinson, Aug. 19–Sept. 22, 1901; No. 11577 on sphagnum, Grandfather Mt., N. C., G. F. Atkinson, 1901; No. 14468, on leaf mold, woods, Lake Piseco, Adirondack Mts., N. Y., G. F. Atkinson, Aug. 26–Sept. 2, 1902."

No. 13613 is now russet, with a whitish mycelioid mass on the ground at its base; spores hyaline, even, 7–9×4½–6 μ.

No. 11577, on *Sphagnum*, has aspect, structure, and spores very similar to No. 13613, and is noteworthy by the different substratum on which it grew.

79. C. foetida Atkinson, Ann. Myc. **6**: 56. 1908; Sacc. Syll. Fung. **21**: 435. 1912. Plate 9, fig. 81.

Type: in Cornell Univ. Herb.

"Plants white, yellow when dry, stipe not distinct, gradually tapering below, 4–6 cm. high, 1,5–2 mm. stout. Odor of garlic. Basidia 2-spored. Spores oboval, granular, then with a large oil drop, 6–9×5–7 μ.—C. U. herb., No. 7740. Coy Glen, Ithaca, N. Y., Aug. 13, 1901. A. M. Ferguson."

Clubs growing on the ground, simple, with hymenial portion honey-yellow, the stem somewhat drab, white at base. I could not find in my preparation spores of the form and dimensions originally published; on the contrary, a few spores present are slightly colored, even, 10–13×4½–5 μ, and some other spores are hyaline, even, 6×3 μ—in both cases too few for me to be sure that they are the spores of this species.

80. C. sphaerospora Ellis & Ev. Jour. Myc. **4**: 74. 1888; Sacc. Syll. Fung. **9**: 248. 1891. Plate 9, fig. 82.

Type: in N. Y. Bot. Gard. Herb.

"On the ground in a garden, St. Martinsville, La., July, 1888. Langlois, 1435. Slender, 8–10 cm. high, cinereous or pale mouse-color, loosely branched, ultimate divisions subulate. Spores, (white)? globose, 5–7 diam. The whole plant is quite slender, the common stem below being only about 1–2 mm. thick, and the few upright subundulate branches of about the same thickness throughout."

Clubs many, simple, some sparingly branched above, now light drab; spores copious, hyaline, even, globose, 7 μ in diameter.

Perhaps this species should be in the Section *Ramaria* near *C. amethystinoides* of very similar aspect but more branched and perhaps not specifically distinct.

81. C. filipes Berk. & Ravenel, Grevillea 2: 17. 1873; Sacc. Syll. Fung. 6: 726. 1888. Plate 9, fig. 83.

Type: in Kew Herb., no specimen to be found in Curtis Herb.

"Pallide rufa; stipite filiformi distincto fistuloso, clavula longo cylindrica curvata. On the ground. Car. Inf. Rav. No. 1488.

"Springing from a white mycelium; pale rufous; stem about an inch high, slender, club the same length."

Miss Wakefield has very kindly studied the type of *C. filipes* in Kew Herb. and made the following notes and also the tracing of the specimens reproduced in the accompanying illustration.

"Now brown in color and not in very good condition. The club is distinct from the stalk—the latter looks more horny. At the base of the stalk there is a paler (cream to tan-colored) mycelium, which rather suggests that the clubs have been attached to leaves or small twigs. As to the spores, those which I have figured, 9–11×5–7 μ, seem most likely to belong, though I saw none attached and there were various other spores present. The basidia made out have 4 sterigmata and are cylindric, 10–12 μ in diameter."

82. C. spathulata Peck, N. Y. State Mus. Rept. 27: 100. *pl. 2. f. 20–21.* 1875; Sacc. Syll. Fung. 6: 725. 1888. Plate 9, fig. 84.

Type: in N. Y. State Mus. Herb.

"Simple, pale yellow; club compressed, spatulate, tapering into the slender slightly furfuraceous stem.

"Plant scarcely more than two lines high.

"Dead branches of hickory trees, *Carya alba.* Greenbush. Oct.

"The color is like that of *Spathularia flavida.*"

The clubs emerge from crevices in the bark—sometimes 2 or 3 in a cluster—and are now ivory-yellow; tissue softens when moistened and was probably fleshy; basidia simple; spores which probably belong to this species are hyaline, even, 9–10×4–4½ μ—other spores present are hyaline, even, 4×3 μ—neither kind seen attached to basidia.

83. C. argillacea Persoon, Comment. Clav. 74. 1797; Fries, Syst. Myc. 1: 482. 1821; Hym. Eur. 675. 1874; Peck, N. Y. State Mus. Rept. 24: 82. 1872; Sacc. Syll. Fung. 6: 719. 1888; Cotton & Wakefield, Brit. Myc. Soc. Trans. 6: 191. 1919. Plate 9, fig. 85.

C. ericetorum Persoon, Obs. Myc. **2**: 60. 1799; Myc. Eur. **1**: 180. 1822; Boudier, Icones, *pl. 175.* 1905-10.

Illustrations: Fries, Obs. Myc. **2**. *pl. 5. f. 3;* Boudier, *loc. cit.;* Patouillard, Tab. Anal. Fung. *f. 585.*

Clubs simple, gregarious, 2–5 cm. high, pale greenish yellow, fragile, cylindric or flattened, with one or more grooves, surface often minutely channelled, apex blunt; smell none, taste like tallow; stem distinct, yellowish; basidia with 4 sterigmata; spores hyaline, even, 10–11×5–6 μ (or sometimes 10–14×6–7 μ).

In heathy places.

Cotton and Wakefield add further: "This species is a typical plant of heather moors and similar heathy places."

84. C. corynoides Peck, N. Y. State Mus. Rept. **31**: 39. 1879; Sacc. Syll. Fung. **6**: 726. 1888. Plate 9, fig. 86.

Type: in N. Y. State Mus. Herb.

"Small, simple, clavate; club obtuse, yellowish, or cream colored, gradually narrowed below and losing itself in the short white stem.

"Gregarious, about half an inch high.

"Damp ground by roadsides. Adirondack Mountains. Aug."

Clubs now pinkish buff in all parts; spores hyaline, even, curved, 6–7×2½–3 μ, very similar in long tapering base to those of *C. gracillima.*

85. C. gracillima Peck, N. Y. State Mus. Rept. **28**: 53. *pl. 1. f. 9.* 1876; Sacc. Syll. Fung. **6**: 725. 1888. Plate 9, fig. 87.

Type: in N. Y. State Mus. Herb.

"Simple, very slender, smooth, about 1′ high, rather tough; club acute or acuminate, pale yellow, a little thicker than the long slender distinct bright yellow shining stem.

"Among moss in a pasture. Northville. August. (Plate 1, fig. 9.)

"In this species, as in *C. argillacea,* the hymenium is quite distinct from the stem."

Clubs now light ochraceous buff; spores hyaline, even, or perhaps somewhat rugose, 7–8×3½–4½ μ. I noted the spores as rugulose when examining them in aqueous preparation but am not certain about this upon reexamining them later in the glycerine mount.

86. C. vernalis Schweinitz, Naturforsch. Ges. Leipzig Schrift. **1**: 112. 1822. Plate 9, fig. 88.

C. clavata Peck, Buffalo Soc. Nat. Sci. Bul. **1**: 62. 1873; N. Y. State Mus. Rept. **25**: 83. *pl.1. f. 9.* 1873; Sacc. Syll. Fung. **6**: 726. 1888.

"C. simplicissima gregaria apice incrassata subrugosa flava, stipite subpellucido.

"Frequens tempore vernali in terra nuda, gregaria sed sparsa nec conferta, silvulas saepe viginti pedes longas efficit iuxta vias in ericetis, unciae quadrantem alta."

C. clavata Peck, *loc. cit.*

"Simple, straight, clavate, obtuse, smooth, not hollow, yellow when fresh, rugose-wrinkled and orange-colored when dry, 4″–6″ high.

"Damp shaded banks by road-sides. Sandlake. June. The surface of the ground where it grows is covered by a green confervoid stratum."

The type fructifications of the above species in both Herb. Schweinitz and N. Y. State Mus. Herb. have been lost, perhaps by the crumbling away of some of the sandy earth by which attached to the mounting sheet. The earthy remains of both specimens show a greenish algal coating and short mosses like that on a collection by Peck from N. Elba, N. Y. and a gathering in quantity at Sharon, Mass., in May, determined by Dr. Farlow as *C. vernalis,=C. clavata.* As Peck endorsed on his type sheet *C. clavata* as a synonym of *C. vernalis*—an opinion in which I concur—I am so treating this species.

The spores of the N. Elba specimen are hyaline, even, flexuous, 7½–9×2½–3½ μ; those of the Sharon specimen white in the mass, even, 7–7½×2½–3 μ. The clubs of the Sharon specimen were pinkish cinnamon of Ridgway above, paler below, and white at the base when fresh, 10 mm. long, 1¼ mm. in diameter in the broadest part, and have dried orange-cinnamon.

Specimens of *C. vernalis* from New Jersey were distributed by Ellis in his North American Fungi, 613, and from Massachusetts in Reliquiae Farlowianae, 311.

87. C. inaequalis Müller, Fl. Dan. *pl. 836. f. 1.* 1778; Fries, Syst. Myc. **1**: 481. 1821; Hym. Eur. 674. 1874; Peck, N. Y. State Mus. Bul. **22**: 87. 1869; Sacc. Syll. Fung. **6**: 719. 1888; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 189. 1919.

Plate 9, fig. 89.

Clavaria similis Boudier & Patouillard, Jour. de Bot. 2: 446. 1888.

Illustrations: Fl. Dan., *loc. cit.* For list of others under synonyms and illustrations, see Cotton & Wakefield, *loc. cit.*

Fructifications simple, or very rarely with one or two branchlets, 4–7½ cm. high, usually in small groups but occasionally single; clubs cylindric or flattened, even or with one or more furrows, bright yellow to rich orange, apex obtuse or pointed; stem not distinct; flesh whitish, fibrous; basidia with 4 sterigmata; spores hyaline, white or slightly ochraceous in the mass, subglobose, echinulate, 5–6 (–8) μ in diameter.

Among grass in woods, parks, lawns, etc.

Cotton and Wakefield add further: " This is by far the most frequent of the simple, yellow Clavarias, being found in short grass in a variety of situations every season. It may be distinguished at once from all other yellow species by its subglobose, spiny spores."

I have American specimens from Massachusetts and Vermont, but with the spiny spores only about 4–6 μ in diameter.

88. C. citriceps Atkinson, Ann. Myc. 6: 56. 1908; Sacc. Syll. Fung. 21: 434 (as *C. citripes*). 1912. Plate 10, fig. 90.

Type: in Cornell Univ. Herb.

"Plants subclavate, 1,5 cm. high, 2–3 mm. stout, citron yellow, white below, deeper yellow when dry. Spores oval, white, smooth, with an oil drop, 4–5×3 μ.—C. U. herb., No. 13461, ground, Beebe Lake woods, Ithaca, N. Y., C. O. Smith, Aug. 11, 1902."

Clubs growing two together in one instance, somewhat irregular, obtuse, drying rugose and russet, with stem somewhat pinkish buff; spores hyaline, even, 4½–5×3 μ.

89. C. clara Berk. & Curtis, Linn. Soc. Bot. Jour. 10: 338. 1868; Sacc. Syll. Fung. 6: 726. 1888. Plate 10, fig. 91.

Type: in Curtis Herb. and also in Kew Herb. probably.

"Simplex, deorsum attenuata, pallide aurantiaca, semipellucida, gracilis, cylindrica, subacuta; hymenio cum basi continuo.

"On the ground. About an inch high." [Cuba. C. Wright, 557].

Clubs simple, attenuated below, pale golden yellow, semipellucid, slender, cylindric, somewhat acute, without a distinct stem.

Clubs now resin-colored, i. e., between vinaceous-russet and Prussian red; spores hyaline, even, subglobose, 4–4½×3–3½ μ.

90. C. laeticolor Berk. & Curtis, Linn. Soc. Bot. Jour. **10**: 338. 1868; Sacc. Syll. Fung. **6**: 725. 1888. Plate 10, fig. 92.

Type: in Curtis Herb. and also in Kew Herb. probably.

"Simplex, intense aurantiaca, cylindrica, obtusa, basi pallidior; stipite indistincto.

"On earth in woods. November. Scarcely 1 inch high." [Cuba. C. Wright, 226].

Clubs simple, deep golden yellow, cylindric, obtuse, with the base rather paler; stem not distinct.

Clubs now cinnamon; spores hyaline, even, 4½–6×4–4½ μ.

The clubs have not dried quite identical with those of *C. flavella,* but when in fresh condition they should be compared with the description of the latter and also with that of *C. pulchra.*

91. C. pulchra Peck, N. Y. State Mus. Rept. **28**: 53. *pl. 1. f. 10.* 1876; Sacc. Syll. Fung. **6**: 725. 1888. Plate 10, fig. 93.

Type: in N. Y. State Mus. Herb.

"Simple, small, about 1′ high, club elongate-clavate, obtuse, yellow, sometimes a little darker at the apex, gradually tapering into the whitish or pale yellow stem-like base.

"Ground and decaying wood in damp shaded places. Northville and Chittenango Falls. August. (Plate 1, fig. 10.)

"A pretty species, associated with *C. fusiformis* in both localities, but differing from it in shape and habit."

Clubs now tawny to brick-red, with the stem pinkish buff; basidia simple, with 4 sterigmata; spores hyaline, even, slightly flattened on one side, 6×4½ μ.

The clubs are not as slender as those of *C. laeticolor;* perhaps other differences may be found when the characters of both species in their fresh condition are better known.

92. C. flavella Berk. & Curtis, Linn. Soc. Bot. Jour. **10**: 338. 1868; Sacc. Syll. Fung. **6**: 726. 1888. Plate 10, fig. 94.

Type: in Curtis Herb. and also in Kew Herb. probably.

"Simplex, gracilis, flavida, cylindrica, acuta, hymenio cum basi angustata confluente; sicca opaca, striata.

"On the ground. About an inch high."[1] [Cuba. C. Wright, 561.]

Clubs simple, slender, yellow, cylindric, acute, the hymenium confluent with the base, drying opaque and striate.

Clubs now have the hymenial portion Prussian red (resin-

colored) and the basal portion somewhat fuscous; spores hyaline, very thin-walled, 6–7×4½–5 μ, probably even, but only a few seen and these do not show an outline sharp enough so that I am certain as to whether even.

93. C. pistillaris Linn. Fl. Suec. 456, No. 1266. 1755; Fries, Syst. Myc. **1**: 477. 1821; Hym. Eur. 676. 1874; Sacc. Syll. Fung. **6**: 722. 1888; Atkinson, Mushrooms, 202. *text f. 203;* Peck, N. Y. State Mus. Bul. **94**: 50. *pl. 93. f. 1–4.* 1905; as *C. pistillaris umbonata,* N. Y. State Mus. Mem. **4**: 178. *pl. 66. f. 15–17.* 1900; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 193. 1919.

Illustrations: Atkinson, *loc. cit.;* Bulliard, Herb. de la France, *pl. 244;* Batsch, Elenchus Fung. *pl. 11. f. 46;* Dufour, Atlas Champ. *pl. 70. f. 156;* Fl. Dan. *pl. 1255;* Hussey, Ill. Brit. Myc. **1**: *pl. 62;* Krombholz, Nat. Abbild. u. Beschr. Schwämme, *pl. 54. f. 1–11;* Quelet, Champ. Jura et Vosges **1**. *pl. 21, f. 2;* Hard, Mushrooms, 471. *text f. 396;* Peck, *loc. cit.*

Clubs simple, solitary, clavate or obovate, obtuse, 5–15 cm. high, 1–5 cm. thick in the upper part, whitish, then dingy ochraceous, solid, soft within; flesh white, taste mild, edible; basidia with 2–4 sterigmata; spores ochraceous in the mass, almost hyaline under the microscope, even, 12–16×7–8 μ.

On ground in mixed woods. Probably widely distributed in the United States.

C. pistillaris is easily distinguished by its large, clavate clubs, sometimes split at the apex when very large. The spore dimensions given above are after Cotton and Wakefield; the spores are 9–12×4½–6½ μ in such American specimens as I have seen. *Craterellus pistillaris,* a rarer species with us, is of somewhat similar aspect but has its clubs truncate.

94. C. ligula Schaeffer, Icones Fung. *pl. 171.* 1863; Fries, Syst. Myc. **1**: 477. 1821; Hym. Eur. 676. 1874; Peck, N. Y. State Mus. Rept. **24**: 82. 1872; Sacc. Syll. Fung. **6**: 722. 1888; Kauffman, N. Y. State Mus. Bul. **179**: 92. 1915; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 193. 1919.

Plate 10, fig. 95.

Illustrations: Schaeffer, *loc. cit.;* Schmidel, Icones Pl. *pl. 5. f. 1;* Fl. Dan. *pl. 837. f. 1;* Dufour, Atlas Champ. *pl. 69. f. 155.*

Clubs simple, gregarious, clavate, 3–7 cm. high, 5–10 mm. in

diameter in the upper part, much narrowed and downy towards the base, solid, pinkish buff when young, finally cinnamon or approaching Rood's brown, apex obtuse; stem not distinct from hymenial part; basidia with 4 sterigmata; spores hyaline, even, 10–14×3–4 μ in European specimens, 7–12×3–4 μ in American specimens.

On ground and fallen leaves in coniferous woods. New Hampshire, Vermont, New York, Pennsylvania, Ontario, Missouri, Colorado and Idaho—probably more widely distributed. August to October. Probably common.

C. ligula differs from *C. pistillaris* in smaller size, paler color, and slenderer spores. It is usually abundant when found. At Middlebury, Vermont, it formed a fairy ring 5 feet in diameter.

95. C. fistulosa Holmskiold, Fungi Dan. **1**: 15. *pl. 6.* 1790; Fries, Syst. Myc. **1**: 479. 1821; Hym. Eur. 677. 1874; Persoon, Syn. Fung. 599. 1801; Myc. Eur. **1**: 177. 1822; Sacc. Syll. Fung. **6**: 723. 1888; Peck, N. Y. State Mus. Rept. **26**: 72. 1874; Harper, Mycologia **10**: 54. *pl. 4. f. A, B.* 1918; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 194. 1919. Plate 10, fig. 96.

C. Ardenia Sowerby, British Fungi, *pl. 215.* 1797.—*C. pilipes* Müller, Fl. Dan. *pl. 1076. f. 1.* 1792.—Other synonyms in Cotton & Wakefield, *loc. cit.*

Illustrations: in addition to those cited above Fl. Dan. *pl. 1256;* Harper, Mycologia **10**: *pl. 3;* Krombholz, Nat. Abbild. u. Beschr. Schwämme, *pl. 5. f. 19.*

Clubs simple, solitary or 2 or 3 near together, erect, tough, slender, 5–20 cm. high, narrowly clavate, often twisted, even, becoming hollow with age, at first yellowish, then date-brown, villose at the base; contains laticiferous, unseptate, hyphae frequently branched, 6 μ in diameter; basidia with 4 sterigmata; spores hyaline, even, 10–17×7–9 μ —12–16×6 μ in American specimens.

On fallen limbs buried in leaves on the ground in mixed woods and in coniferous swamps. New York to Michigan and in Ontario. September to November. Rare.

C. fistulosa may be recognized by its long, slender clubs which become hollow, and by the spores. See Harper, *loc. cit.*, for account of the forms of this species and of the following species of the same group.

96. C. contorta Holmskiold, Fungi Dan. **1**: 29. *pl. 12.* 1790; Fries, Syst. Myc. **1**: 478. 1821; Hym. Eur. 677. 1874; Sacc. Syll. Fung. **6**: 723. 1888; Harper, Mycologia **10**: 55. *pl. 4. f. C.* 1918; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 194. 1919. Plate 10, fig. 97.

Illustrations: Holmskiold, *loc. cit.;* Harper, *loc. cit.;* Boudier, Soc. Myc. Fr. Bul. **33**. *pl. 1. f. 5;* Fl. Dan. *pl. 1852. f. 1.*

Clubs erumpent, simple or irregularly branched, contorted, 2–3 cm high, pale yellowish drab, darker when moist, fairly tough; branches 4–6 mm. thick, short, blunt, wrinkled, not attenuated, at length hollow; stem not distinct; smell and taste none; latex tubes present; basidia with 4 sterigmata; spores hyaline, even, 14–18×6–9 μ —17–23×8–10 μ according to Cotton and Wakefield for British specimens.

On branches of dead alder, etc. New England, South Carolina, and Michigan. Rare.

It has been claimed that *C. contorta* is a contorted form of *C. fistulosa.* Those who believe otherwise assert its distinctive characters are its erumpent, dwarf, fasciculate habit, paler, more grayish color, entirely glabrous club covered everywhere with the hymenium, larger spores, and occurrence on dead branches still remaining on the tree. I have seen no specimen of *C. contorta.*

97. C. juncea Fries, Obs. Myc. **2**: 291. 1818 and 1824; Syst. Myc. **1**: 479. 1821; Hym. Eur. 677. 1874; Peck, N. Y. State Mus. Rept. 22: 87. 1869; Sacc. Syll. Fung. **6**: 724. 1888; Harper, Mycologia **10**: 56. *pl. 5.* 1918; Cotton & Wakefield, Brit. Myc. Soc. Trans. **6**: 195. 1918. Plate 10, fig. 98.

Illustrations: Boudier, Icones, *pl. 176;* Harper, *loc. cit.*

Clubs simple, in groups of 2 or 3, filiform, weak, 5–8 cm. high, ½–1½ mm. thick, dirty yellow, then tinged rusty or brownish drab, hollow, hairy at the base; smell none, taste acrid; basidia with 4 sterigmata; spores hyaline, even, 8–12×4–5 μ.

On fallen frondose leaves in woods. New England to Michigan. Abundant locally.

C. juncea may be readily recognized by its long filiform clubs of acrid taste, growing on leaves in woods in periods of prolonged wet weather.

98. C. asperulospora Atkinson, Ann. Myc. **6**: 55. 1908; Sacc. Syll. Fung. **21**: 433. 1912. Plate 10, fig. 99.

Type: in Cornell Univ. Herb.

"Plants clustered, wood brown, 4–7 cm. high, 2–3 mm. stout, cylindrical, blunt, tapering below. Basidia abruptly clavate, 30×10–12 μ, 4-spored. Spores globose, white, echinulate, pedicellate, 6–7 μ. —C. U. herb., No. 13182, Fall Creek woods, Ithaca, N. Y., Whetzel, Aug. 3, 1902."

Clubs growing on the ground, now fuscous-black; spores hyaline, becoming echinulate, 6–7 μ in diameter, copious.

SPECIES IMPERFECTLY KNOWN

C. (Ramaria) **Berkeleyi** Montagne, Syll. Crypt. 180. 1856; Sacc. Syll. Fung. **6**: 715. 1888.

"Fragilis, e pallido lutescens; caule ascendente tenui ramosissimo, ramis teretibus repetito-trichotomis fastigiatis, ramulis seu divisionibus terminalibus capitato-fasciculatis purpureis acutisque. Caespitem efformat compactum.

"Hab. Ad truncos in locis humidis dejectis. Columbus [Ohio]: Sullivant, Icon. n° 51.

"Desc. Caulis in ligno decumbens, tenuis, teres vel compressus, mox adscendens, luteo-pallescens, 6–8 centim. longus, fastigiato-ramosissimus. Rami repetito-subtrichotomi, quandoque subfasciculati, axillis rotundatis, crassitudine pennam corvinam aequantes, sensim ascendendo attenuati. Ramuli ultimi fasciculato-capitati vel digitati, divaricati, apicibus acutis rubris. Sporae . . . . . Exsiccatione tota planta nigrescit."

C. bicolor Rafinesque, Med. Repos. II. **5**: 363. 1808; Desvaux, Jour. de Bot. **1**: 233. 1808.

"Aggrégée, cylindrique, alongée, bleue; sommet obtus, d'une couleur rose.

"En Virginie."

C. citrina Rafinesque, Med. Repos. II. **5**: 362. 1808; Desvaux, Jour. de Bot. **1**: 233. 1808.

"Cylindrique, fistuleuse, aggrégée, jaunâtre; sommet mince, demi-obtus.

"En Pensylvanie."

C. citrino-fusca Rafinesque, Med. Repos. II. **5**: 362. 1808; Desvaux, Jour. de Bot. **1**: 233. 1808.

"Demi-aggrégée, subulée, jaune; sommet brun aigu.

"Dans l'état de Pensylvanie."

C. compressa Berkeley, Ann. & Mag. Nat. Hist. **10**: 383. *pl. 12. f. 16.* 1842, nec Schw.; Sacc. Syll. Fung. **6**: 714. 1888.

Plate 10, fig. 100.

"Pallida, mycelio fibrilloso niveo, stipite compresso, furcato; ramis paucissimis tenuibus cylindricis; apicibus acutis.

"Jamaica. Herb. Mus. Brit. On rotten wood.

"Plant 1¼ inch high; mycelium white, branched, fibrillose, penetrating into the wood; stem compressed, 1½ line thick, springing from a broader base, divided above into four principal, rather flexuous, slender cylindrical-branches connected at the base, and forked once or twice only; tips very acute. The whole plant is of a pallid ochraceous hue.

"This species is evidently allied to *Clavaria crispula* and *byssiseda.* It agrees more with our common forms of *Clavaria* than those which are peculiar to the Tropics."

Although characters of the spores were not published it is probable that this species might be recognized among Clavarias from Jamaica by the above description, figure, and occurrence on wood. *C. compressa* Schw. has priority.

C. driophylla Rafinesque, Med. Repos. II. **5**: 363. 1808; Desvaux, Jour. de Bot. **1**: 233. 1808.

"Pédonculée; peridium cylindrique, obtus, jaune.

"En Pensylvanie."

C. fuscescens Fries, R. Soc. Sci. Upsal. Acta III. **1**: 116. 1851; Sacc. Syll. Fung. **6**: 714. 1888.

"A basi tenui ramosissima, glabra, pallida, sicca fusca, ramis teretibus solidis multifidis filiformibus laevibus apice subulatis.

"Ad Mirador regni Mexicani ad truncos putridos. Liebman.

"Juxta *C. pyxidatam* videtur inserenda, sed sporae ignotae. Admodum gracilis, 1½ unc. alta, maxime et repetito-ramosa, sed omnes rami filiformes, undique glabri. Sicca mollis et flaccida.

"Similis species lecta (ad terram ?) ad S. Bartolini, Trapede de la conception, colore non diversa, sed ramis intricatis crispulis, ceterum *C. crispulae* simillima."

C. incurvata Morgan, Cincinnati Soc. Nat. Hist. Jour. **11**: 88. *pl. 2. f. 2* 1888; Sacc. Syll. Fung. **11**: 134. 1895.

Plate 11, fig. 101.

"Fragile. Trunk thick, fleshy, white; branches ochraceous,

dichotomously very much branched; the branchlets spreading, somewhat flexuous, rugulose, the apices dentate. See Plate II., Fig. 2.

"On the ground in woods; rare. Trunk white, an inch and a half in height and 1 inch thick; branches and branchlets ochraceous, 2–3 inches longer, with an extent of 3 or 4 inches. The peculiar feature is the spreading branches curving outward and upward."

In the paper cited, Morgan stated that the spores of this species are ochraceous, and he located the species in the group with *C. formosa* and *C. aurea* but did not give dimensions of the spores nor whether even or rough. I have been unable to obtain this needed information, because Professor Wylie kindly informs me that no specimen of *C. incurvata* can be found in Morgan Herbarium, which now belongs to the University of Iowa. On the possibility that Morgan might have given a specimen of the species to Farlow, Peck, or Ellis, I sought in their herbaria for such an authentic specimen but did not find one.

C. lepidorhiza Rafinesque, Med. Repos. II. 1: 362. 1808; Desvaux, Jour. de Bot. 1: 233. 1808.

"En forme de cylindroïde; fistuleuse, rougeâtre; racine et base écailleuse; le sommet arrondi.

"Se trouve en Maryland et près du Hâvre-de-Grâce."

C. molaris Berkeley, Grevillea 7: 5. 1878; Sacc. Syll. Fung. 6: 727. 1888.

"Erumpens, coccinea, apice verrucosa 1. cristata.

"On dead branches of *Magnolia glauca*. Newfield, New Jersey, June, 1873. Ellis. No. 892.

"About a line high, bursting through the bark, scarlet, thickened upwards. Apex either coarsely warty or with a multitude of crest-like processes; spores clavate, acuminate below, .0075 mm., .0003 in. long. Allied to *C. contorta.*"

Miss Wakefield could not find the type of this species in Kew Herb.; I have been unable to find it in the Ellis Coll. in N. Y. Bot. Gard. Herb. or in Farlow Herb.

C. polita Fries, R. Soc. Sci. Upsal. Acta III. 1: 116. 1851; Sacc. Syll. Fung. 6: 706. 1888.

"A basi ramosa, glabra, albida, sicca rigido-fragilis, pallescens, ramis fistulosis parce divisis inaequalibus acutis.

"In Mexico ad Zuacapa. *Liebman.*

"Habitus peculiaris, politus, fere Corallinae. Caulis a basi solutus in ramos pauciores, parce subdichotomos, teretes 1. in axillis compressos, longitudine inaequales. Sicca polita et nitida est, at colorem non mutat."

C. radiata Léveillé, Ann. Sci. Nat. Bot. III. 5: 156. 1846; Sacc. Syll. Fung. 6: 713. 1888.

"Receptaculis gregariis pedicellatis ramosis, ramis fastigiatis nudis, laevibus elongatis sursum dilatatis margine fimbriatis proliferisque,—Hab. Vera-Cruz (Mexico). Galeotti, n° 6849 (herb. Mus. Par.).

"OBS. Cette Clavaire, comme quelques autres, rappelle le *Cladonia pyxidata;* elle s'élève à la hauteur de 5 à 6 centimètres, et forme un petit buisson plus ou moins épais. Le pédicule, dont la longueur varie de 1 à 2 centimètres, se dilate en forme d'entonnoir à sa partie supérieure, et donne naissance à trois ou quatre rameaux grêles a leur partie inférieure, tandis que la supérieure, également dilatée, est prolifère: ces divisions se répètent ainsi trois ou quatre fois; les dernières seules sont simples et aiguës."

C. sulphurascens Schweinitz, Am. Phil. Soc. Trans. N. S. 4: 182. 1832; Sacc. Syll. Fung. 6: 709. 1888.

"Aestate inter folia putrescentia, Bethl.

"C. delicatula, semiunciali altitudine. Caule aut stipite tereti, basi incrassata, albo-pruinosa; apice ramosa, ramis subfastigiatis teretibus, ramulis breviusculis corniculatis acutis. Radiculis byssoideis foliis insidens. Color totius fungi, e sulphureo-subfuligineus."

I could find no specimen of this species in either Herb. Schweinitz or Curtis Herb.

C. tetragona Schweinitz, Naturforsch. Ges. Leipzig Schrift. 1: 112. 1822; Sacc. Syll. Fung. 6: 708. 1888.

"C. subsimplex fragilis flava, stipite furcato furcisque quadrangularibus.

"Passim autumno ad abrupta umbrosa madida. Substantia

similis Cl. eburneae, unciam sesquialteram alta, tum apice furcata vel bifurcata, etiam in bifurcationibus conservans formam quadrangularem."

I could find no specimen of *C. tetragona* in either Schweinitz Herb. or Curtis Herb.

C. trichomorpha Schweinitz, Naturforsch. Ges. Leipzig Schrift. **1**: 112. 1822; Sacc. Syll. Fung. **6**: 730. 1888.

"C. simplex gregaria candida utrinque attenuata subpellucida.

"Fasciculis densis provenit in caulibus putrescentibus Zeae, in horto deiectis, vere, semunciam longa."

I have found no specimen of *C. trichomorpha* in either Herb. Schweinitz or Curtis Herb.

C. tricolor Rafinesque, Med. Repos. II. **5**: 363. 1808; Desvaux, Jour. de Bot. **1**: 233. 1808.

"Pédonculée; peridium obovale, verdâtre à la base, jaune dans le milieu; sommet rond et rougeâtre.

"Dans l'état de Maryland."

EXCLUDED SPECIES

Calocera albipes (Mont.) Berk. & Curtis, Grevillea **2**: 18. 1873; Sacc. Syll. Fung. **6**: 737. 1888.

Clavaria albipes Montagne, Ann. Sci. Nat. Bot. II. **18**: 244. 1842.

"Gregaria, simplicissima, stricta, clavula utrinquè attenuata apice acuta pallidè rufescens glaberrima, stipite basi dilatatâ candidâ ligno mucido adhaerente.

"Hab. ad lignum semiputridum mucidumque in provinciâ vel statu *Ohio* Americae foederatae a cl. Sullivant lecta mecumque à cl. Asa Gray communicata."

I found no specimen in Curtis Herb. or Farlow Herb.

99. Lachnocladium ornatipes (Peck) Burt, n. comb.

Plate 11, fig. 102.

Clavaria ornatipes Peck, N. Y. State Mus. Bul. **122**: 18, 160. 1908; Sacc. Syll. Fung. **21**: 432. 1912.—*C. trichopus* of Peck, N. Y. State Mus. Rept. **24**: 82. 1872, but not of Persoon.—*Lachnocladium bicolor* of Burt. Mo. Bot. Gard. Ann. **6**: 274.

pl. 5. f. 6, text f. 13. 1920, but not *Clavaria bicolor* Pk.

Type: in N. Y. State Mus. Herb.

"Clubs 1–2 inches tall, gregarious, sparingly branched; stem slender, hairy, fuscous or brown, the branches irregular, terete, whitish, grayish or cinereous, the tips acute or obtuse; spores broadly elliptic or subglobose, .0003–.00045 of an inch long, .00024–.0003 broad.

"In low swampy woods, usually among mosses. Sand Lake.

"In New York State Museum Report **24**, page 82 this was referred to Clavaria trichopus Pers. After seeing specimens of it from other localities and finding it constantly differing from the descriptions of that species, which is called "snowy white" and is much branched, it has seemed to us to be distinct."

The spores of the type are hyaline, even, subglobose, 8–9× 7–7½ μ; basidia with 2 sterigmata. Occurs in New Hampshire and Massachusetts also.

100. Lachnocladium subcorticale (Schw.) Burt, n. comb.

Plate 11, fig. 103.

Clavaria subcorticalis Schweinitz, Am. Phil. Soc. Trans. N. S. **4**: 182. 1832; Sacc. Syll. Fung. **6**: 709. 1888.

Type: in Herb. Schweinitz; no duplicate in Curtis Herb.

"Rarissime sub cortice reperta monte Menango chunk, Jersey.

"C. uncialis, caule brevi tenuori, ramoso-dilatata, ramis subdivaricatim furcatis, compressulis; alutaceo-alba, valde pulverulenta, et subvillosa. Apicibus ramorum acutis. Cornu cervinum aemulat."

The fructification is now between light buff and warm buff, few-branched dichotomously, with the axils rounded, surface clothed with a minutely subtomentose covering of matted fibers. When moistened the texture does not seem fleshy enough for a *Clavaria;* the hyphae are thin-walled, collapsed, about 3 μ in diameter, apparently nodose septate. No basidia found in a preparation and only three spores, two of which are hyaline, rough, 7–9×4½–6 μ and the other, hyaline, even, 9×6 μ. These spores are so few in number that they may not have been borne by this specimen.

As no basidia were found, it may be that *C. subcorticalis* is a *Tremellodendron.* The aspect of this species is so distinctive that future collections should be recognized by the accompanying figure.

101. Lachnocladium vestipes (Peck) Burt, n. comb.

Plate 11, fig. 104.

Clavaria vestipes Peck, N. Y. State Mus. Bul. **116**: 34. 1907. —*C. bicolor* Peck, N. Y. State Mus. Bul. **54**: 954. 1902, but not *C. bicolor* Mass.—*C. Peckii* Sacc. & D. Sacc. in Sacc. Syll. Fung. **17**: 196. 1905, but not *C. Peckii* Sacc. Syll. Fung. **9**: 249. 1901.

Type: in N. Y. State Mus. Herb.

"Small, 8–12 lines high, gregarious; stem slender, .5–1 line thick, straight or flexuous, solid, tomentose, pale yellow, divided above into two or more short, orange colored compressed branches which are themselves once or twice dichotomously divided, tips acute, concolorous.

"Under pine trees. Bolton. September.

"The rather tough tomentose stem indicates an affinity to the genus *Lachnocladium.*"

The hymenial portion is now orange-cinnamon, rugulose and waxy, and the stem chamois-colored, short tomentose in some fructifications and fibrillose in others; spores hyaline, subglobose, 3–4 μ in diameter, becoming distinctly rough. *C. asperula* and *C. asperulans* should be compared with this species.

102. Tremellodendron tenax (Schw.) Burt, n. comb.

Plate 11, figs. 105, 106.

Clavaria tenax Schweinitz, Am. Phil. Soc. Trans. N. S. **4**: 182. 1832.—*Merisma tenax* (Schw.) Léveillé, Ann. Sci. Nat. Bot. III. **5**: 157. 1846.—*Pterula tenax* (Schw.) Sacc. Syll. Fung. **6**: 742. 1888.—*Tremellodendron Hibbardi* Lloyd, Myc. Writ. **6**. Myc. Notes 65: 1049. *pl. 179. f. 1947.* 1921.

Type: in Herb. Schweinitz and a fragment in Curtis Herb.

"Ad terram nudam in Insula Lehigh prope Bethl.

"C. fasciculata, substantia tenacissima, demum subcornea, e basi jam ramoso-divisa, ramis compressis, apice fere in membranam dilatatis, ramulis minutis irregulariter prominentibus et inde fimbriatis. Colore alutaceo-rufo. Uncialem altitudinem non excedit."

Fructifications fascicled with substance very tough, at length somewhat horn-like, soon ramose-divided from the base; branches compressed, dilated at the apex into almost a membrane; branchlets minute, irregularly extended and then fimbriate. Color alutaceous red. Does not exceed an inch in height.

The specimen in Herb. Schweinitz is compressed, not fleshy when moistened, and has the hymenium fuscous; basidia lon-

gitudinally septate; spores hyaline, even, flattened on one side, 9×5½ μ.

A specimen of *Tremellodendron Hibbardi,* fig. 106, collected by Miss Hibbard at West Roxbury, Mass.—the type locality—agrees well with the original specimen of *Clavaria tenax,* fig. 105. *T. tenax* has somewhat the aspect of some forms of *T. pallidum* but is readily separable from the latter by the very dark hymenium of *T. tenax.*

Clavaria gigantea Schweinitz, Naturforsch. Ges. Leipzig Schrift. **1**: 113. 1822; Am. Phil. Soc. Trans. N. S. **4**: 182. 1832; Fries, Elenchus Fung. **1**: 231. 1828. Plate 11, fig. 107.

Acurtis gigantea (Schw.) Fries, Summa Veg. Scand. 337. 1849; Sacc. Syll. Fung. **6**: 691. 1888; **11**: 139. 1895; Cooke, Grevillea **20**: 11. 1891; Berkeley, Gardeners' Chron. **9**: 339. 1878.

Type: authentic specimen from Herb. Schweinitz now in Curtis Herb.; no specimen in Herb. Schweinitz.

"C. caespitosa carnosa, clavis difformibus compressis contortis substriatis maximis albo-testaceis.

"Septembri et Octobri. Caespites ad radices arborum et in terra efformat magnitudine capitis humani, fungus omnino abnormis, quibusdam annis frequens, aliis rarissimus. Ex una radice, subradiculosa oriuntur clavae interdum regulares, ad sex uncias latae, unam vel tres uncias altae et unciam crassae; substantia carnosa et fibrosa agaricina, odore muscoso Agarici Prunuli. Interdum clavae solitariae occurrunt. Quandoque pulvere albo detergibili tegitur."

Present-day collections of this fungus would not be referred to the *Clavariaceae,* for very careful examination of preparations of the outer surface of the fructifications of the authentic specimens does not show basidia nor any distinctive spores or fruiting organs by which the fungus may be classified. I did not find any evidence that these pyriform masses are Agarics overrun by a *Hypomyces.* European mycologists have found in Europe malformations of *Lentinus tigrinus* of such form that they so regard *"Clavaria gigantea."* In the Eastern United States *Clitopilus abortivus* may form in great abundance malformations very similar in aspect and consistency to the specimens of *"Clavaria gigantea"* which have been preserved; it is my opinion that the latter was based on such abortive growths. The note by Schweinitz of odor of *Agaricus* [*Clitopilus*] *prunulus* favors this conclusion also.

Craterellus pistillaris Fr.—See Burt, Mo. Bot. Gard. Ann. **1**: 341. *pl. 16, 17, f. 13, 14.* 1914.

Clavaria truncata Lovejoy, Bot. Gaz. **50**: 385. 1910.

"Pileate tops bright red, shading into reddish orange at top of stipe to dull flesh color at its base: ends truncate, convex to plane to somewhat concave, 0.5–3 cm. broad, smooth: whole plant to within a few centimeters of base of stipe covered with a white bloom, persisting in dried specimens: flesh creamy, spongy: stipe longitudinally grooved to base, 3–10 cm. long: spores white, 14×7 μ.

"Habitat: Humus soil under balsam and spruce trees; gregarious and cespitose, 4–6 in a group; Foxpark, alt. 2900 meters, August 8, 1909, no. 66.

"A plant similar to this is described by Fries as *Craterellus pistillaris* and by others as possibly a variety of *Clavaria pistillaris,* but in a collection of twenty specimens found in entirely different localities not one out of the number was found to have either the color or the form of typical *Clavaria pistillaris.*"

I have not seen authentic specimens of *C. truncata* but its description, quoted above, shows that *C. truncata* is a synonym of *Craterellus pistillaris* and extends the American range of the latter to the Rocky Mountain region.

103. Pistillaria Typhuloides (Peck) Burt, n. comb.

Plate 11, fig. 108.

Clavaria Typhuloides Peck, N. Y. State Mus. Rept. **30**:49. *pl. 2. f. 12–14.* 1878; Sacc. Syll. Fung. **6**: 731. 1888.

Type: in N. Y. State Mus. Herb.

"Very small, about two lines high, rather tough, scattered or gregarious, clavate, white, the stem slightly pruinose, gradually swelling into the obtuse glabrous subcompressed solid club; spores oblong-elliptical, .0002′–.0003′ long, with an oblique point at the base.

"Dead stems of *Epilobium angustifolium.* Adirondack. August.

"This belongs to the section Holocoryne, and is apparently allied to *C. uncialis,* but its much smaller size and usually compressed club will serve to distinguish it. When dry the white color is well retained and the hymenium has a subpellucid appearance and is of a firmer texture than the center of the club."

The dried fructifications are now clavate, with the hymenial region cream-buff and the stem whitish; basidia simple but I cannot decide from reexamination of my preparation in glycerine

medium as to whether only 2-spored; spores hyaline, even, slightly curved, 5–6×2½ μ, copious. The hyphae have the outer portion of the wall gelatinously modified and the center of the club, which Peck noted as not as firm in texture as the hymenium, has become very hard in the dried clubs and did not soften after moderately prolonged moistening.

EXOTIC SPECIES

104. Clavaria decolor Berk. & Curtis, Am. Acad. Arts & Sci. Proc. 4: 124. 1858; Sacc. Syll. Fung. 6: 712. 1888. Plate 11, fig. 109.

Type: specimen from type collection in Farlow Herb.

"Ex albo umbrina; stipite cylindrico e fibris ramosis oriundo sursum subdichotomo, ramis brevibus.

"On hill-sides, Hong Kong. - Allied to *C. abietina.*"

The earth at base of the fructifications shows that they grew on the ground. The collector's note with the specimen is "In dense thickets on hillsides, Hong Kong. White soon turning brown or black."

The fructifications are now between drab and hair-brown; spores hyaline, minutely rough, globose, 3–4×3 μ, numerous but none seen attached to basidia, and possibly foreign, because the specimens are mouldy.

105. C. delicia Berkeley, Hooker's Jour. Bot. 8: 274. 1856; Sacc. Syll. Fung. 6: 710. 1888. Plate 11, fig. 110.

Lachnocladium delicia (Berk.) Cooke, Grevillea 20: 10. 1891.

Type: probably in Kew Herb., a specimen from the type collection in Curtis Herb.

"Ochracea, caespitosa, delicata; stipitibus brevibus cylindricis e mycelio candido membranaceo oriundis, ramis furcatis hic illic divergentibus, ultimis acutissimis. Spruce, n. 161.

"Hab. On dead leaves and twigs. March, 1853. Panuré. [Brazil].

"Ochraceous, about half an inch high, forming delicate, tree-like tufts. Stems short, cylindrical, clothed at the base with a little down, and arising from a white, downy, membranous disc, forked two or three times, some of the branches spreading so as to form little tree-like tufts; ultimate ramuli very acute.

"An extremely pretty species, with the habit of *C. flaccida,* but approaching in substance the white-branched *Thelephorae,*

though more transparent. At first sight it has somewhat the appearance of *T. dissecta,* Lév., a very differently constructed species."

Fructifications now pinkish buff with whitish mycelium at the base; spores hyaline, even, globose, 4–5 μ in diameter.

106. C. delicata Fries, Syst. Myc. 1: 475. 1821; Hym. Eur. 670. 1874; Sacc. Syll. Fung. 6:699. 1888. Plate 11, fig. 111.

Type: authentic specimen from Fries, collected at Upsala, Sweden, in Curtis Herb.

"Tenella, e basi ramosa, candida, deorsum villosa, ramis gracilibus, elongatis, teretibus, aequalibus, erectis, acutis . . . . . Ad ligna mucida Fagi. Eximia."

Fructification now sorghum-brown to Rood's brown, somewhat rugose, attached to the wood by a whitish mycelial base; spores hyaline, even, somewhat curved, 5–6×2½ μ. This fructification is not on *Fagus* but on coniferous wood, for the wood substratum consists of tracheids with bordered pits.

107. C. scabra Berkeley, Hooker's Jour. Bot. 8: 277. 1856; Sacc. Syll. Fung. 6: 728. 1888. Plate 11, fig. 112.

Type: probably in Kew Herb., a specimen from the type collection in Curtis Herb.

"Simplex umbrina acuminata pusilla scabra; basi tuberosa, setis erectis strigosa. Spruce, n. 157.

"Hab. On the ground. Panuré. [Brazil].

"About 1/3 of an inch high, gregarious, subcaespitose, pale umber, simple, erect, acuminate, scabrous with little rough granules; base tuberose, clothed with white or pallid, erect bristles.

"This is in many respects like *Calocera tuberosa,* but it appears to be a true *Clavaria,* and is distinguished by its smaller size, scabrous hymenium, and the erect or slightly divergent, not deflexed, bristles at the base.—There is another simple *Clavaria* in the collection, growing on a green substance, which appears to be an anamorphosis of some Lichen. The specimens are however too imperfect to afford much information."

The fructifications have dried resin color (somewhat cinnamon) with the base whitish; spores not certainly made out in my preparation, possibly minute, even, subglobose, 1½–2 μ in diameter.

108. C. cirrhata Berkeley, Hooker's Jour. Bot. 8: 275. *pl. 5. f. 5.* 1856; Sacc. Syll. Fung. 6: 708. Plate 11, fig. 113.

Type: authentic specimen in Curtis Herb.

"Caespitosa, alba, ramosa; ramis suberectis cylindricis, apicibus rectis curvatisque acutis.

"Hab. On the ground. Mount Cocui. [Brazil].

"Two inches high, ochraceous, white, caespitose, much branched; branches cylindrical, tips straight or curved.

"This was first referred as a variety to *Clavaria furcellata,* but this indication is untenable, and I have therefore described it under a distinct name."

Instead of being only 2 inches high as published, the dried fructification is twice that height, or 9½ cm., as shown by the accompanying illustration which is natural size. The hymenial regions are now cartridge-buff and the stem and sterile branch portions pinkish buff and fibrillose-squamulose; the axile tissue of stem and branches is somewhat colored; spores hyaline, even, globose, 5–6 μ in diameter.

The consistency of the moistened fructification seems to me too firm and tough for *Clavaria* and I believe that this species will be transferred to *Lachnocladium,* when its characters are better known from the study of specimens in fresh condition. Perhaps the South American *Lachnocladium cirratum* or one of Hennings' Brazilian species may prove identical with Berkeley's *C. cirrhata.*

109. Lachnocladium dealbatum (Berk.) Cooke, Grevillea 20: 10. 1901. Plate 11, fig. 114.

Clavaria dealbata Berkeley, Hooker's Jour. Bot. 8: 275. 1856; Sacc. Syll. Fung. 6: 707. 1888.

Type: specimen from the type collection in Curtis Herb.

"Caespitosa, alba, opaca; stipite brevi tenui cylindrico sursum 5–6-furcato ramis dilatatis, apicibus subuncinatis acutis. Spruce, n. 159.

"Hab. On the ground. March, 1853. Panuré. [Brazil].

"White, opaque, 2 inches or more high, caespitose, fastigiate. Stem short, cylindrical, not a line thick, forked five or six times so as to make a tree-like tuft, dilated above, the ultimate divisions somewhat divaricate, the forks below acute, above rounded, ultimate ramuli acute.

"A very singular species, remarkable for its white-washed appearance. The branches, except at the extremities, are far

broader than the stem, and strongly compressed when dry. Spruce compares this with n. 601, [*Stereum proliferum*], but the two species do not appear to me to have much in common."

Main stem and branches now olive-buff and the terminal branchlets pinkish cinnamon (resinous); spores hyaline, echinulate, $3\frac{1}{2}$–$4 \times 2\frac{1}{2}$–$3\ \mu$, copious. I found only one branch broader than the stem, while several branches are of the same diameter as the main stem. The consistency of the substance when moistened is such that the transfer to *Lachnocladium* seems probably correct.

INDEX TO SPECIES OF CLAVARIA.

Explanation of Plates

PLATE 1

All figures of plates 1 to 11 have been reproduced natural size from photographs of dried herbarium specimens unless otherwise noted.

Fig. 1. *Clavaria botrytis.* After the figure in Fries, Sverig. Atl. Svamp., *pl. 35.*

Fig. 2. *C. botrytoides.* Type.

Fig. 3. *C. conjuncta.* Type.

Fig. 4. *C. secunda.* Type.

Fig. 5. *C. densissima.* Type.

PLATE 2

Fig. 6. *C. holorubella.* Type.

Fig. 7. *C. formosa.* After the figure in Persoon, Icones et Descr. Fung., *pl. 3. f. 5.*

Fig. 8. *C. longicaulis.* Type.

Fig. 9. *C. densa.* Type.

Fig. 10. *C. fumigata.* Type.

Fig. 11. *C. spiculospora.* After Atkinson's photograph of the type.

PLATE 3

Fig. 12. *C. aurea.* After Schaeffer, Icones Fung., *pl. 287, f. 4,* under the name *C. flavescens,* a synonym of *C. aurea* and with the better illustration.

Fig. 13. *C. grandis.* Type.

Fig. 14. *C. cyanocephala.* Type.

Fig. 15. *C. xanthosperma.* Type.

Fig. 16. *C. albida.* Type.

Fig. 17. *C. testaceoflava* var. *testaceoviridis.* Type.

PLATE 4

Fig. 18. *C. obtusissima.* Type.

Fig. 19. *C. flava.* After Schaeffer, Icones Fung., *pl. 175, f. 2.*

Fig. 20. *C. flavula.* Type.

Fig. 21. *C. leucotephra.* Type.

Fig. 22. *C. flavobrunnescens.* Type.

Fig. 23. *C. stricta.* After the figure in Persoon, Comment Clav., *pl. 4. f. 1.*

Fig. 24. *C. brunneola.* Specimen in Wright, Fungi Cubenses Wrightiani, 462, which I compared with the type and preferred for the illustration.

Fig. 25. *C. flaccida.* After Fries, Icones Hym., *pl. 199. f. 4.*

Fig. 26. *C. flaccida.* Specimen from Fries in Curtis Herb., collected at Upsala, Sweden.

Fig. 27. *C. pusilla.* Type.

PLATE 5

Fig. 28. *C. abietina.* After Fl. Dan., *pl. 2030. f. 2.*
Fig. 29. *C. stricta* var. *fumida.* Type.
Fig. 30. *C. acris.* Type.
Fig. 31. *C. tsugina.* Authentic specimen, probably type.
Fig. 32. *C. pinicola.* Type.
Fig. 33. *C. circinans.* Type.
Fig. 34. *C. flavuloides.* Type.
Fig. 35. *C. fragrantissima.* Type.
Fig. 36. *C. Kunzei.* After Quelet, Champ. Jura et Vosges 3: *pl. 2. f. 11.*

PLATE 6

Fig. 37. *C. myceliosa.* Type.
Fig. 38. *C. arborea.* Type.
Fig. 39. *C. subcaespitosa.* Type.
Fig. 40. *C. cristata.* After Holmskiold, Fungi Dan., *pl. 23*—three figures.
Fig. 41. *C. mutans.* Type.
Fig. 42. *C. rugosa.* After Bulliard, Herb. de la France, *pl. 448. f. 2.*—two of the six fructifications.
Fig. 43. *C. rufipes.* Type.
Fig. 44. *C. asperula.* Three cited specimens, each marked "Part of type."
Fig. 45. *C. asperulans.* Type.
Fig. 46. *C. nodulospora.* Type.
Fig. 47. *C. pyxidata.* After Persoon, Comment. Clav., *pl. 1. f. 1a.*
Fig. 48. *C. Petersii.* Type distribution.

PLATE 7

Fig. 49. *C. coronata.* Type.
Fig. 50. *C. pinophila.* Type.
Fig. 51. *C. crassipes.* Half of type, which had been split lengthways.
Fig. 52. *C. asterella.* Type.
Fig. 53. *C. divaricata.* Type.
Fig. 54. *C. lentofragilis.* Type.
Fig. 55. *C. corniculata.* After Schaeffer, Icones Fung., *pl. 173. f. 6, 9.*
Fig. 56. *C. Peckii.* Type.
Fig. 57. *C. muscoides* var. *obtusa.* Type.
Fig. 58. *C. fellea.* Type.
Fig. 59. *C. Herveyi.* Type.

PLATE 8

Fig. 60. *C. cinerea.* After Bulliard, Herb. de la France, *pl. 354.*
Fig. 61. *C. cinereoides.* Type.

Fig. 62. *C. amethystina.* After Battarra, Fung. Agri Arim., *pl. 1. f. C.*
Fig. 63. *C. amethystinoides.* Type.
Fig. 64. *C. exigua.* Type.
Fig. 65. *C. aurantio-cinnabarina.* Type.
Fig. 66. *C. fusiformis.* After Sowerby, Brit. Fungi., *pl. 234.*
Fig. 67. *C. compressa.* Type.
Fig. 68. *C. platyclada.* Type.
Fig. 69. *C. Macouni.* Type.
Fig. 70. *C. pilosa.* Type.
Fig. 71. *C. pallescens.* Type.
Fig. 72. *C. nebulosa.* Type collection.

PLATE 9

Fig. 73. *C. lavendula.* Type.
Fig. 74. *C. vermicularis.* After Holmskiold. Fungi Dan. **1:** *pl. 2. f.* at right.
Fig. 75. *C. tenuis.* Type.
Fig. 76. *C. misella.* Type collection.
Fig. 77. *C. mucida.* After Persoon. Comment. Clav.: *pl. 2. f. 3.*
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Fig. 79. *C. biformis.* Type, consisting of Nos. 13432 and 10699.
Fig. 80. *C. subfalcata.* Type.
Fig. 81. *C. foetida.* Type.
Fig. 82. *C. sphaerospora.* Type; best, selected clubs.
Fig. 83. *C. filipes.* After tracing of type.
Fig. 84. *C. spathulata.* Type.
Fig. 85. *C. argillacea.* After Boudier., Icones, *pl. 175. f. a.*
Fig. 86. *C. corynoides.* Type.
Fig. 87. *C. gracillima.* One club of type.
Fig. 88. C. *vernalis.* Collected at Sharon, Mass., May 24, 1917, by A. P. D. Piguet, comm. by W. G. Farlow.
Fig. 89. *C. inaequalis.* After Fl. Dan., *pl. 836. f. l.* (left hand part).

PLATE 10

Fig. 90. *C. citriceps.* Type.
Fig. 91. *C. clara.* Type.
Fig. 92. *C. laeticolor.* Three clubs of type collection, *C. Wright, 226,* compared with type. The clubs of the type are now broken.
Fig. 93. *C. pulchra.* Type.
Fig. 94. *C. flavella.* From type collection, compared by me with type.
Fig. 95. *C. ligula.* After Schaeffer, Icones Fung., *pl. 171. f. 1.*
Fig. 96. *C. fistulosa.* After Holmskiold, Fungi Dan. **1:** *pl. 6.* (right hand part).
Fig. 97. *C. contorta.* After Holmskiold, Fungi Dan. **1:** *pl. 12.* (right hand part).
Fig. 98. *C. juncea.* After Boudier, Icones, *pl. 176. f. b.*
Fig. 99. *C. asperulospora.* Type.
Fig. 100. *C. compressa* Berk. After Berkeley, Ann. & Mag. Nat. Hist. **10:** *pl. 12. f. 16.* Nat. size.

PLATE 11

Fig. 101. *C. incurvata.* After Morgan, Cincinnati Soc. Nat. Hist. Jour. **11**: *pl. 2. f. 2.*

Fig. 102. *Lachnocladium ornatipes.* Type of *Clavaria ornatipes.*

Fig. 103. *L. subcorticale.* Type of *Clavaria subcorticalis.*

Fig. 104. *L. vestipes.* Type of *Clavaria vestipes.*

Figs. 105 and 106. *Tremellodendron tenax.* Fig. 105, type of *Clavaria tenax;* fig. 106, specimen of *Tremellodendron Hibbardi* collected in Massachusetts by Miss A. Hibbard.

Fig. 107. *Clavaria gigantea.* Authentic specimen in Curtis Herb. from Herb. Schweinitz.

Fig. 108. *Pistillaria Typhuloides.* Type of *Clavaria Typhuloides.*

Fig. 109. *Clavaria decolor.* Type.

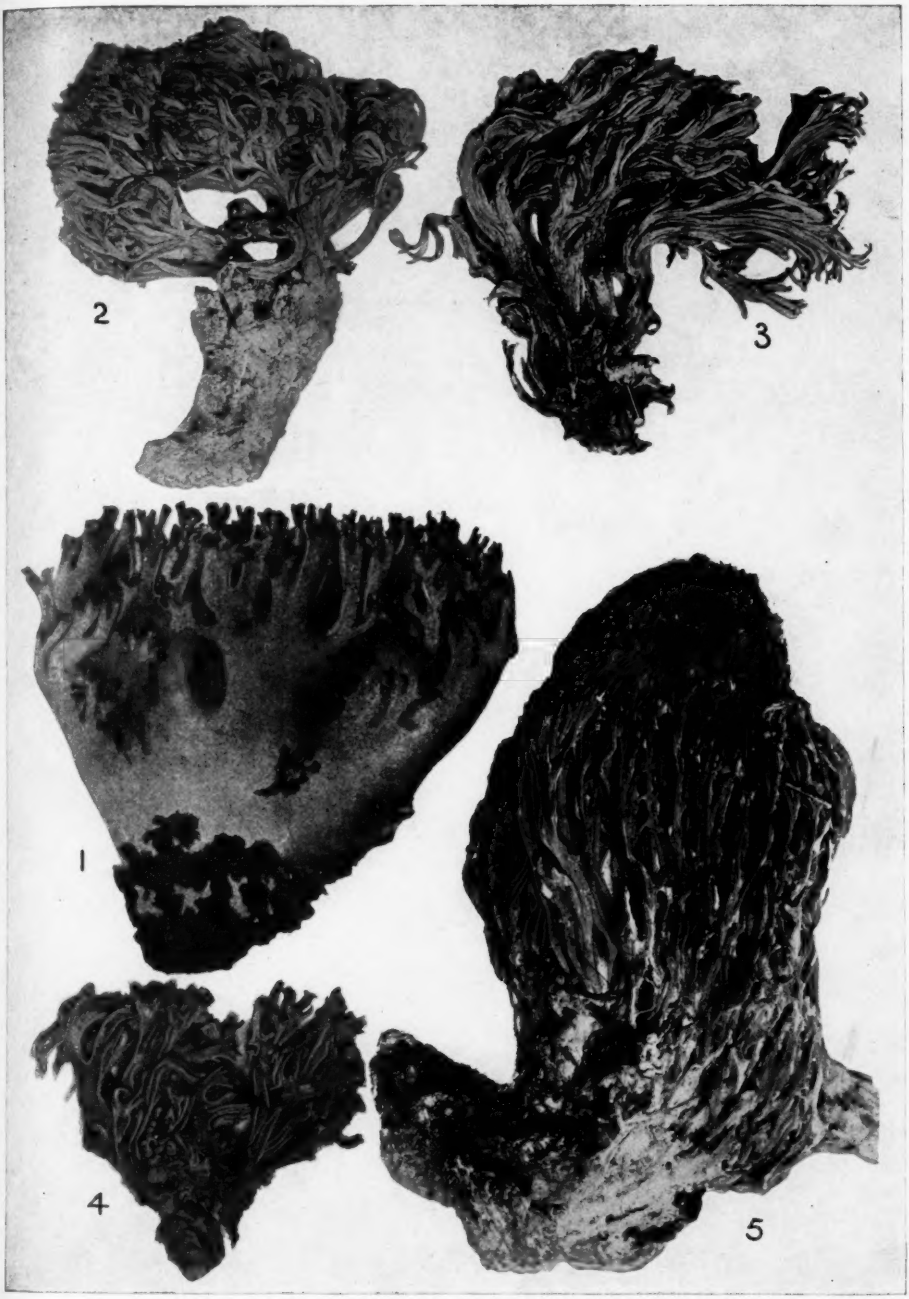
Fig. 110. *C. delicia.* Authentic specimen, *Spruce, No. 161,* in Curtis Herb.

Fig. 111. *C. delicata.* Authentic specimen in Curtis Herb.

Fig. 112. *C. scabra.* Authentic specimen, *Spruce, No. 157,* in Curtis Herb.

Fig. 113. *C. cirrhata.* Authentic specimen in Curtis Herb.

Fig. 114. *Lachnocladium dealbatum.* Authentic specimen, *Spruce, No. 159,* of *Clavaria dealbata* in Curtis Herb.

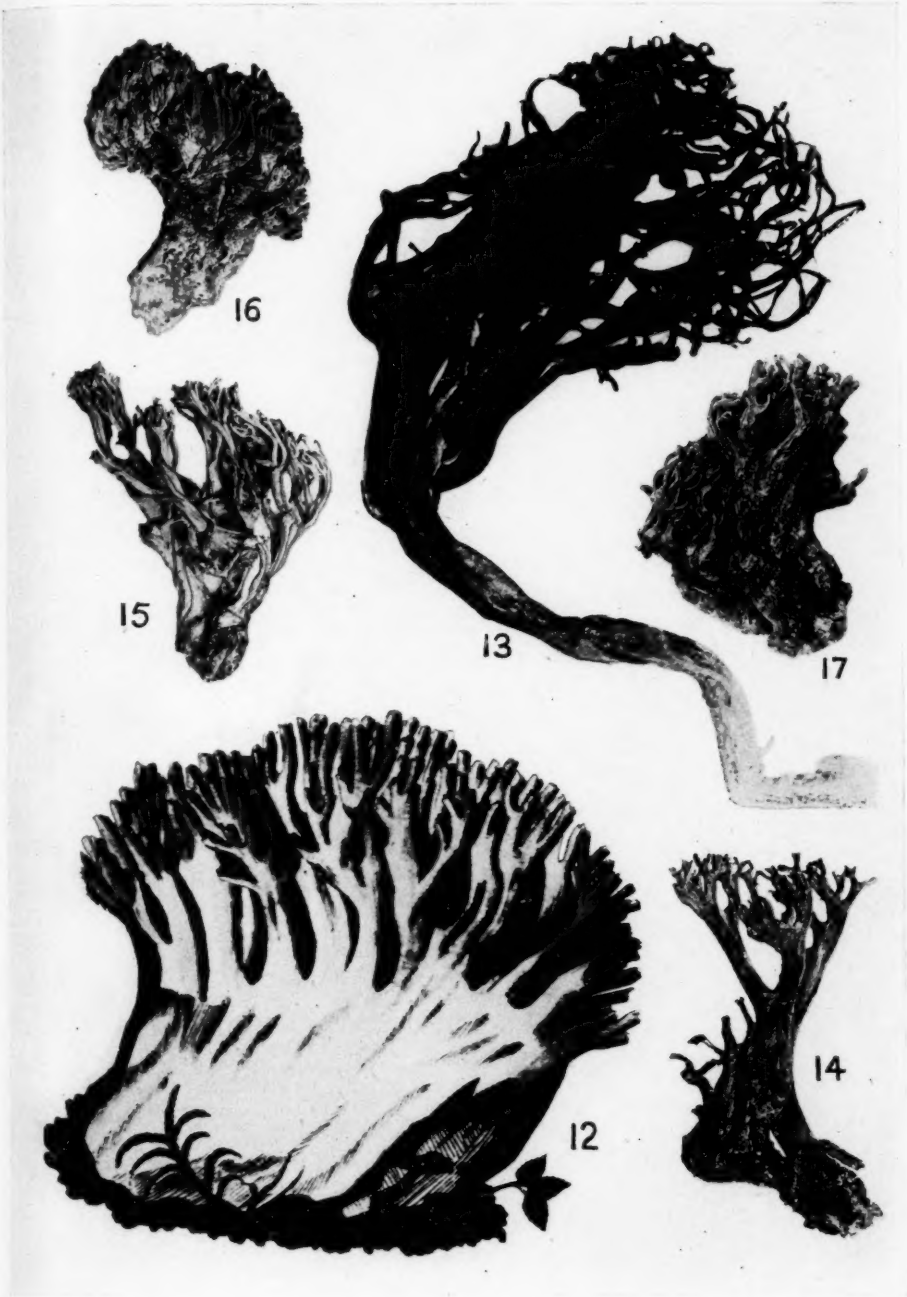


BURT—THE NORTH AMERICAN SPECIES OF CLAVARIA

1. CLAVARIA BOTRYTIS.—2. C. BOTRYTOIDES.—3. C. CONJUNCTA.—4. C. SECUNDA.—5. C. DENSISSIMA

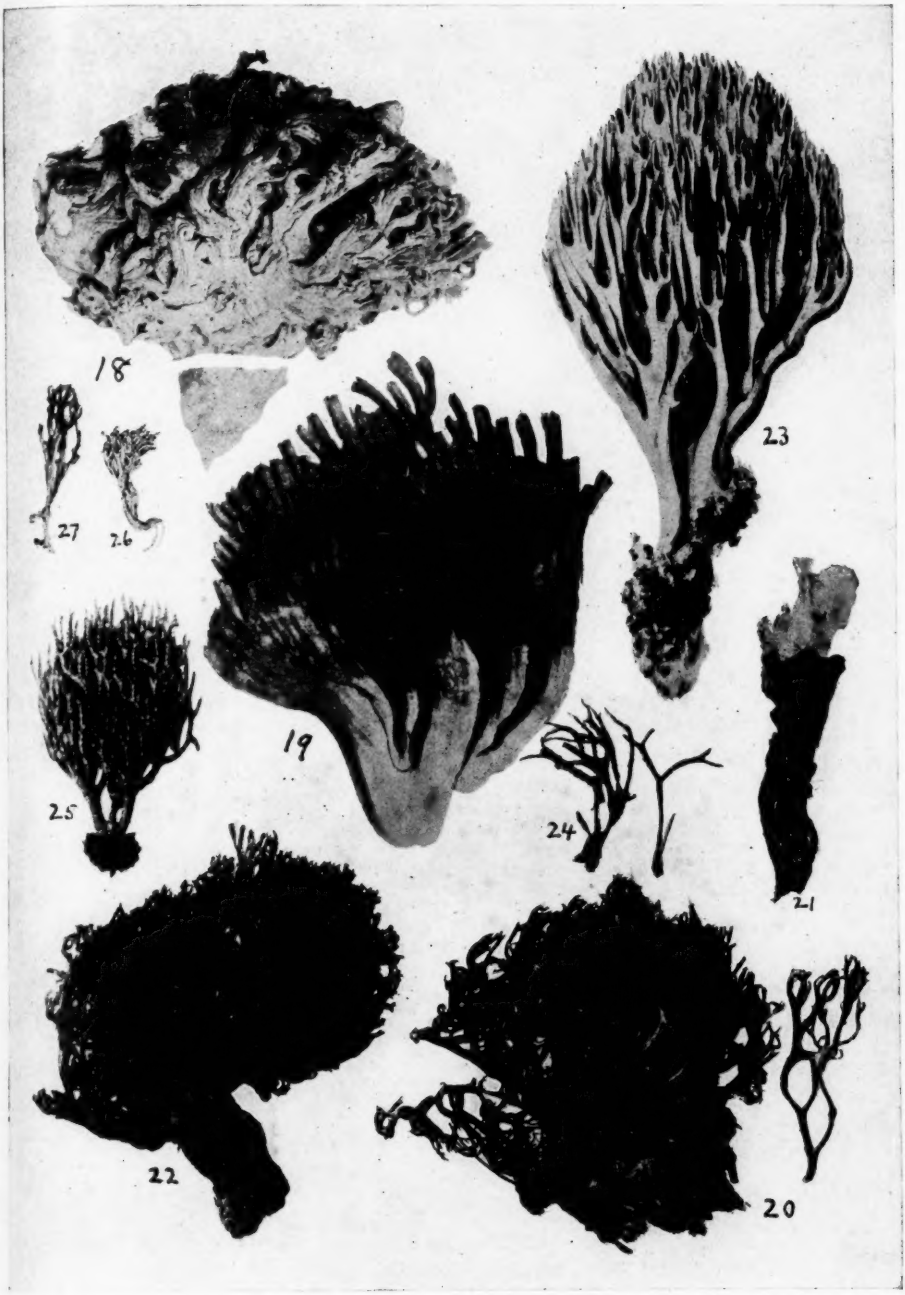
BURT—THE NORTH AMERICAN SPECIES OF CLAVARIA

6. CLAVARIA HOLORUBELLA.—7. C. FORMOSA.—8. C. LONGICAULIS.—9. C. DENSA.—10. C. FUMIGATA.—11. C. SPICULOSPORA



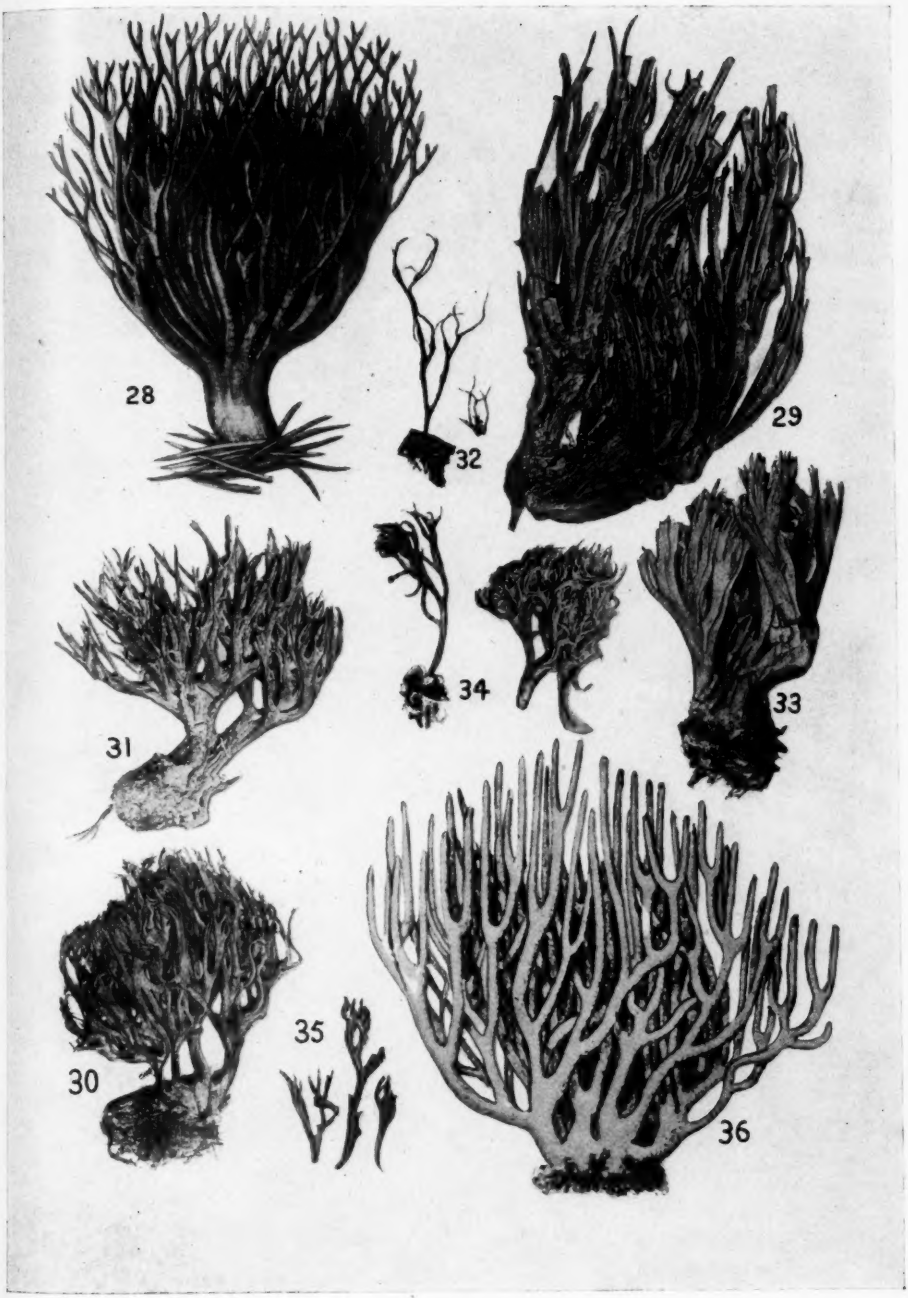
BURT—THE NORTH AMERICAN SPECIES OF CLAVARIA

12. CLAVARIA AUREA.—13. C. GRANDIS.—14. C. CYANOCEPHALA.—15. C. XANTHOSPERMA.—16. C. ALBIDA.—17. C. TESTACEOFLAVA VAR. TESTACEOVIRIDIS



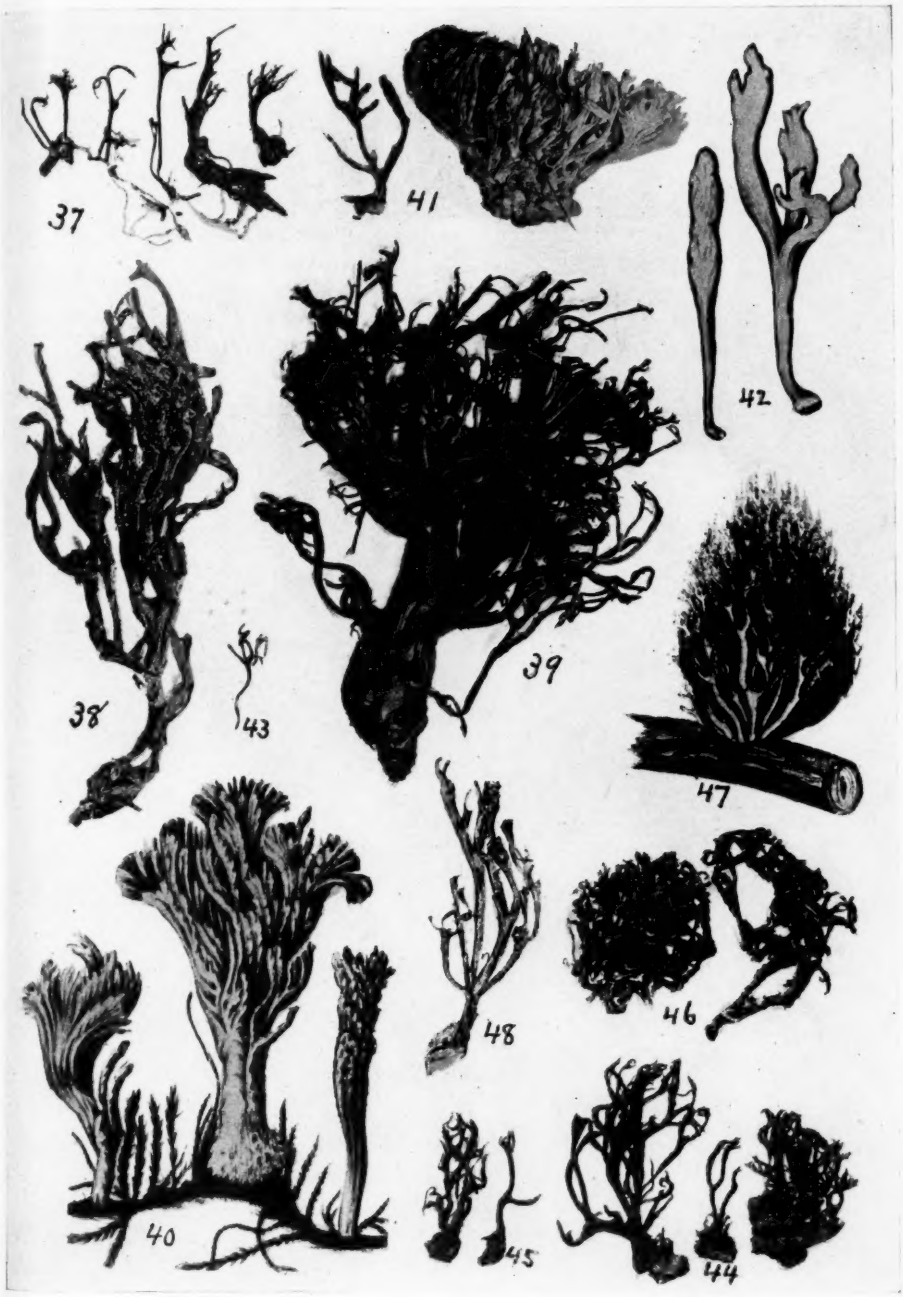
BURT—THE NORTH AMERICAN SPECIES OF CLAVARIA

18. CLAVARIA OBTUSISSIMA.—19. C. FLAVA.—20. C. FLAVULA.—21. C. LEUCOTEPHRA.—22. C. FLAVO-BRUNNESCENS.—23. C. STRICTA.—24. C. BRUNNEOLA.—25. C. FLACCIDA.—26. C. FLACCIDA.—27. C. PUSILLA



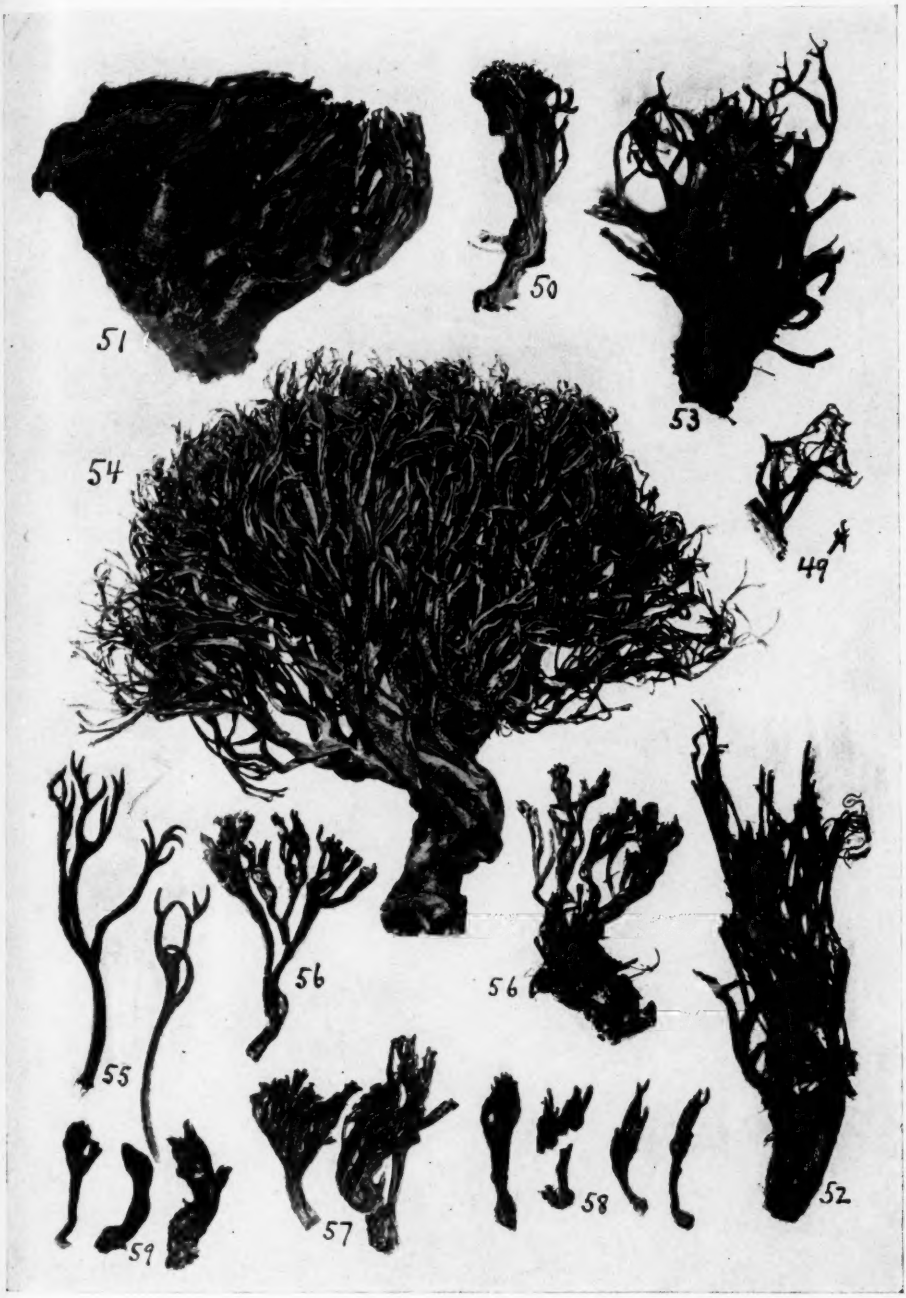
BURT—THE NORTH AMERICAN SPECIES OF CLAVARIA

28. CLAVARIA ABIETINA.—29. C. STRICTA VAR. FUMIDA.—30. C. ACRIS.—31. C. TSUGINA.—32. C. PINICOLA.—33. C. CIRCINANS.—34. C. FLAVULOIDES.—35. C. FRAGRANTISSIMA.—36. C. KUNZEI



BURT—THE NORTH AMERICAN SPECIES OF CLAVARIA

37. CLAVARIA MYCELIOSA.—38. C. ARBOREA.—39. C. SUBCAESPITOSA.—40. C. CRISTATA.—41. C. MUTANS.—42. C. RUGOSA.—43. C. RUFIPES.—44. C. ASPERULA.—45. C. ASPERULANS.—46. C. NODULOSPORA.—47. C. PYXIDATA.—48. C. PETERSII

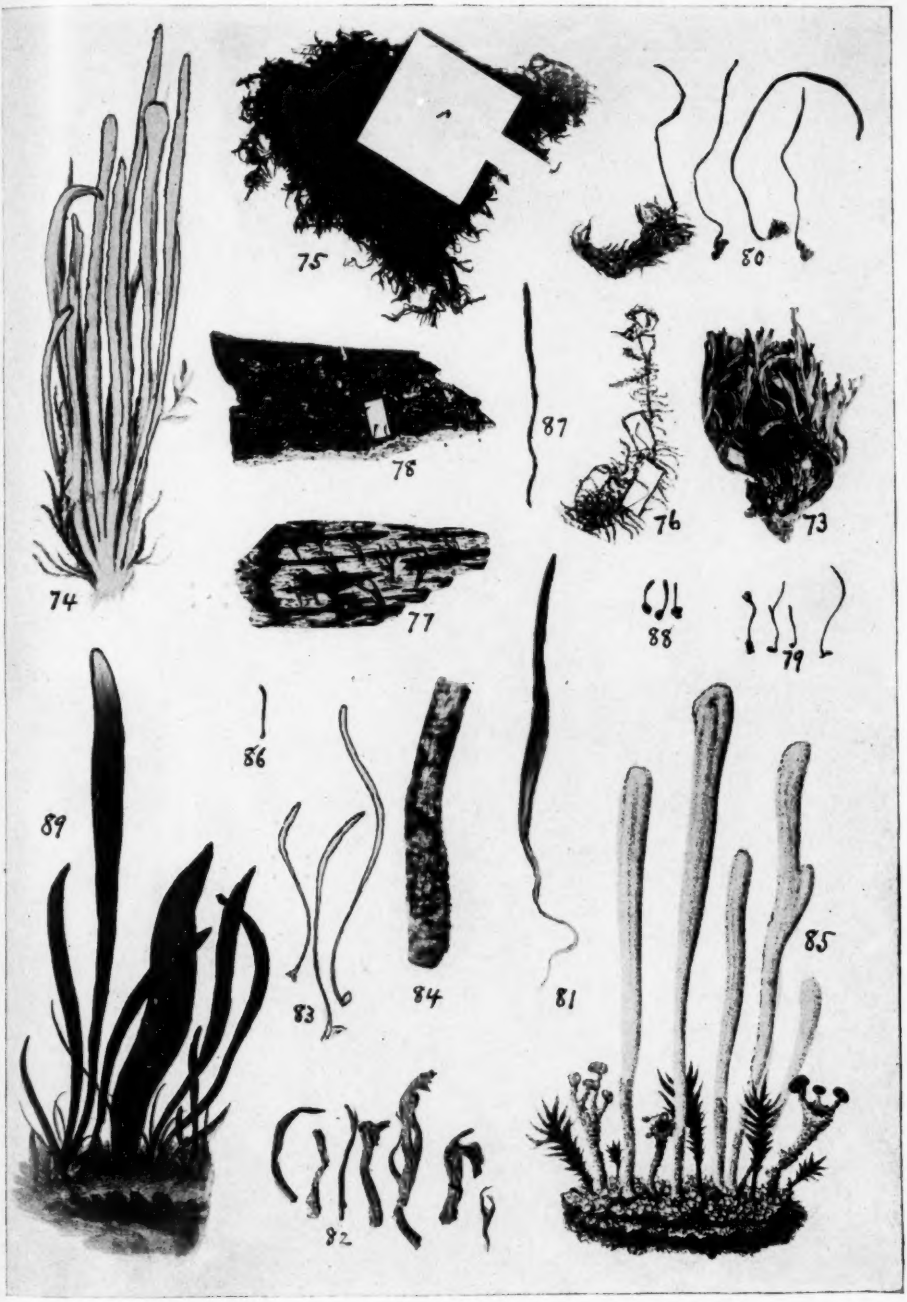


BURT—THE NORTH AMERICAN SPECIES OF CLAVARIA

49. CLAVARIA CORONATA.—50. C. PINOPHILA.—51. C. CRASSIPES.—52. C. ASTERELLA.—53. C. DIVARICATA.—54. C. LENTOFRAGILIS.—55. C. CORNICULATA.—56. C. PECKII.—57. C. MUSCOIDES VAR. OBTUSA.—58. C. FELLEA.—59. C. HERVEYI

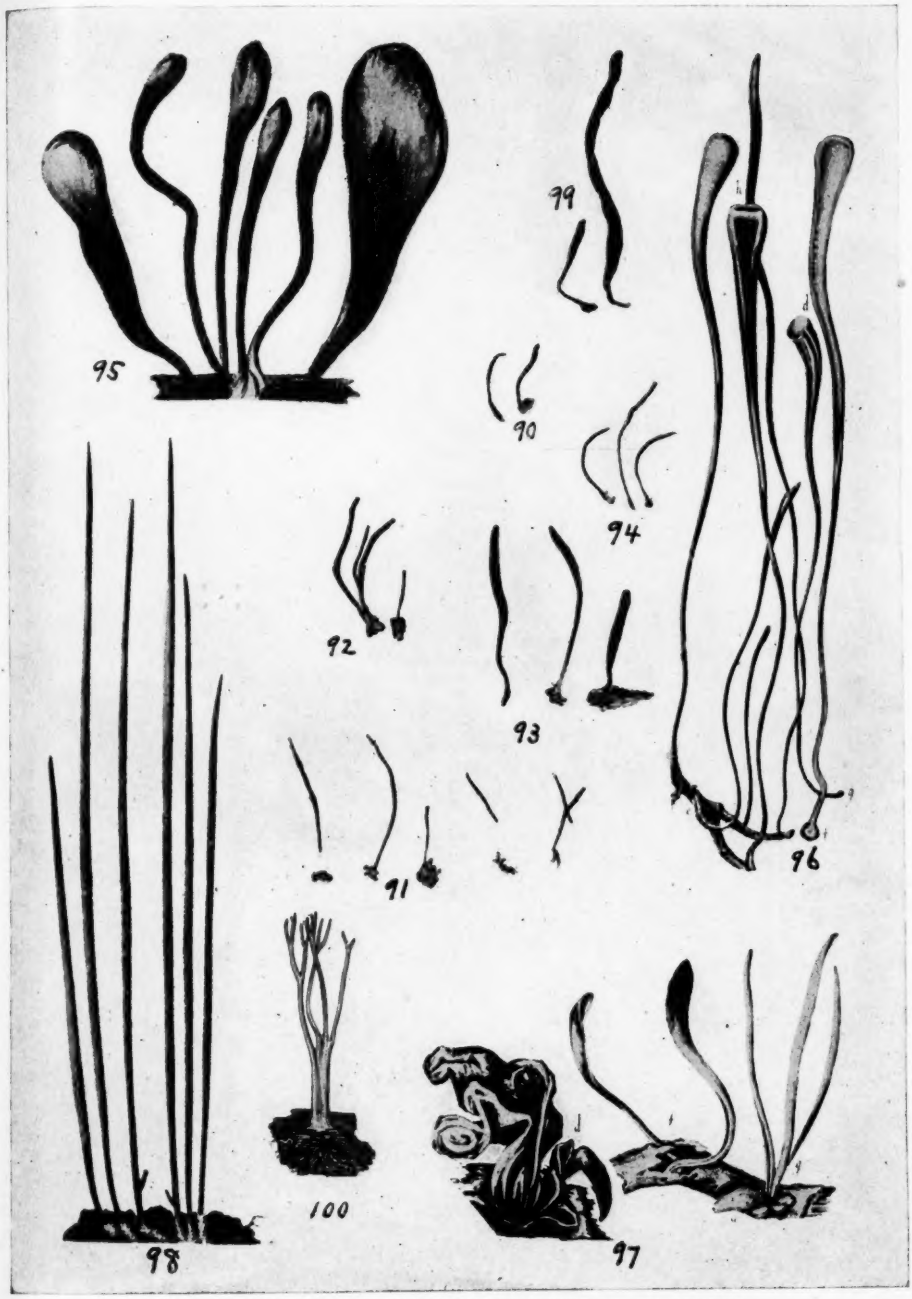
BURT—THE NORTH AMERICAN SPECIES OF CLAVARIA

60. CLAVARIA CINEREA.—61. C. CINEREOIDES.—62. C. AMETHYSTINA.—63. C. AMETHYSTINOIDES.—64. C. EXIGUA.—65. C. AURANTIO-CINNABARINA.—66. C. FUSIFORMIS.—67. C. COMPRESSA.—68. C. PLATYCLADA.—69. C. MACOUNI.—70. C. PILOSA.—71. C. PALLESCENS.—72. C. NEBULOSA



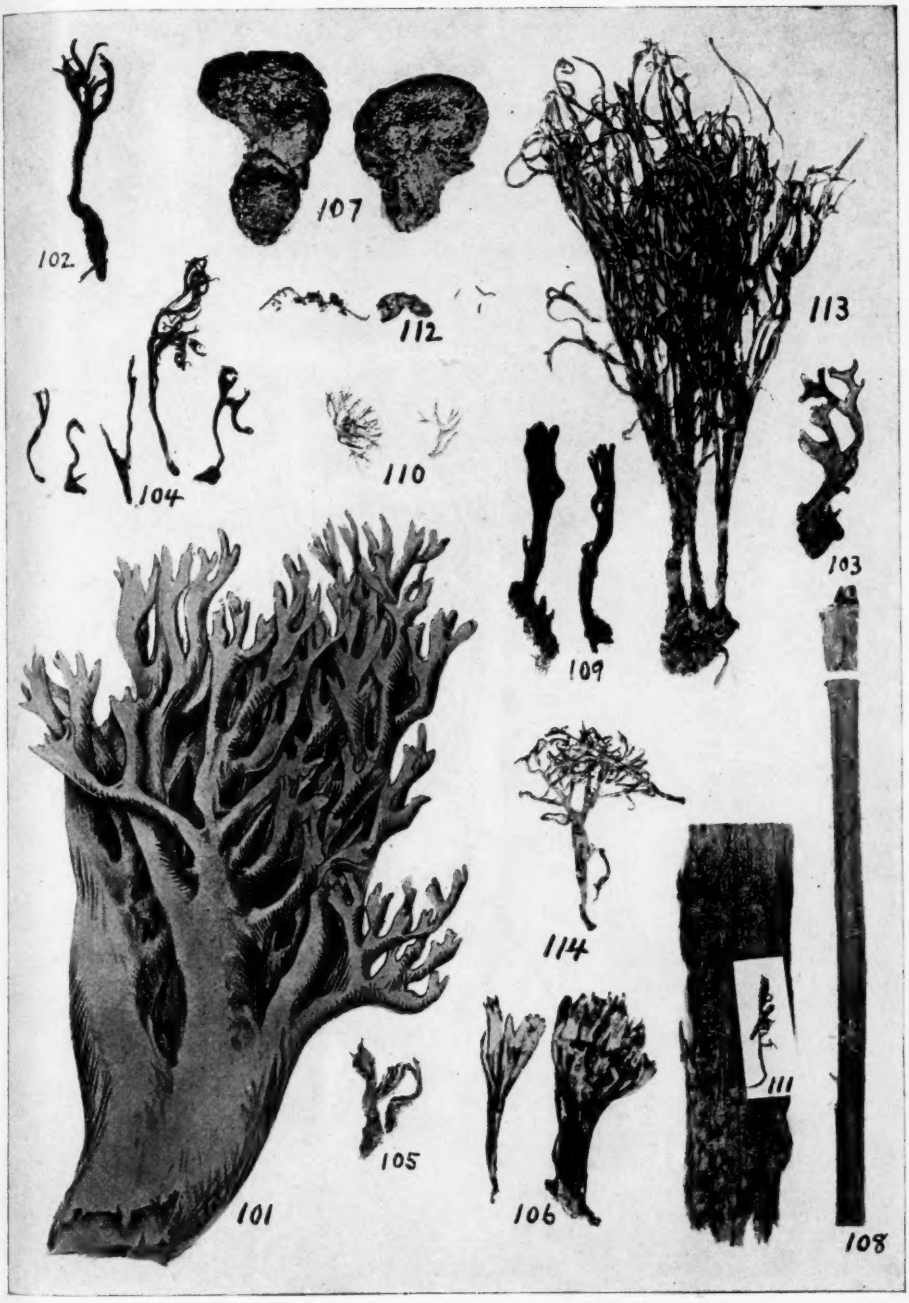
BURT—THE NORTH AMERICAN SPECIES OF CLAVARIA

73. CLAVARIA LAVENDULA.—74. C. VERMICULARIS.—75. C. TENUIS.—76. C. MISELLA.—77. C. MUCIDA.—78. C. MUCIDA VAR. CURTISII.—79. C. BIFORMIS.—80. C. SUBFALCATA.—81. C. FOETIDA.—82. C. SPHAEROSPORA.—83. C. FILIPES.—84. C. SPATHULATA.—85. C. ARGILLACEA.—86. C. CORYNOIDES.—87. C. GRACILLIMA.—88. C. VERNALIS.—89. C. INAEQUALIS



BURT—THE NORTH AMERICAN SPECIES OF CLAVARIA

90. CLAVARIA CITRICEPS.—91. C. CLARA.—92. C. LAETICOLOR.—93. C. PULCHRA.—94. C. FLAVELLA.—95. C. LIGULA.—96. C. FISTULOSA.—97. C. CONTORTA.—98. C. JUNCEA.—99. C. ASPERULOSPORA.—100. C. COMPRESSA



BURT—THE NORTH AMERICAN SPECIES OF CLAVARIA

101. CLAVARIA INCURVATA.—102. LACHNOCLADIUM ORNATIPES.—103. L. SUBCORTICALE.—104. L. VESTIPES.—105–106.—TREMELLODENDRON TENAX.—107. CLAVARIA GIGANTEA.—108. PISTILLARIA TYPHULOIDES.—109. CLAVARIA DECOLOR.—110. C. DELICIA.—111. C. DELICATA.—112. C. SCABRA.—113. C. CIRRHATA.—114. LACHNOCLADIUM DEALBATUM